

The American Midland Naturalist

Devoted to Natural History, Primarily
that of the Prairie States

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J. A. NIEUWLAND, C. S. C., Ph. D., Sc. D., Editor
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Botanical Gleanings in Michigan V. (with illustrations)— <i>By Oliver Atkins Farwell</i>	41
Contributions to the Botany of Michigan, No. 15— <i>By Oliver Atkins Farwell</i>	72
The Stratigraphy and Larger Fossils of the Platten Formation in Ste. Genevieve County, Missouri.....	86
Some Notes on <i>Dibothriocephalus Perfoliatus</i> — <i>By Francis Weninger</i> 97	

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No. 2.

BOTANICAL GLEANINGS IN MICHIGAN V.

OLIVER ATKINS FARWELL

The season was opened on May 5th by a trip to Erie in Monroe County to look for a violet hybrid that the late Dr. Brainerd considered to be new. The small, wet depression where it was found was partially ploughed; but one or two plants were discovered at the edge of the unploughed section. The remaining part was ploughed later, so that this new hybrid station has been wiped out. Associated violets are *V. nephrophylla* and its albino and *V. fimbriatula* and its albino; while not so very far away are *V. communis* and *V. subsagittata*. In company with Prof. Ehlers, of the University of Michigan, and Mr. Billington, of Detroit, a visit was made to the *Trillium grandiflorum* fields near Farmington, May 8th. The field visited is not the one that was the basis of my paper on the variations of this species, though not far distant from it. The special object of the visit was to gather the rhizomes of the different variations for the Botanical Garden of the University. The woods have been sold and are being subdivided, which means the ultimate elimination of this station. The various variations were plentiful. We again confirmed the validity of the pink color-form by finding it here with the petals pink in the bud. On May 11, we found *Viola emarginata* very abundant in the vicinity of Wayne and Eloise. On this day we found a large number of Morels, 28 in number, in a space of four feet, the most we have ever seen at one station. This was at a subdivision called Birch Hill Park. On May 18th, in the vicinity of Washington, wild or naturalized peach, apple, and pear trees were in bloom. On June 15 we visited a Tamarack swamp near Whitmore Lake. This was visited by Mr. Gladewitz some

twenty years ago and at that time the Stemless Ladyslipper was counted by the thousands; now there is not a single specimen. It seems to have been replaced by an abundance of Poison Dogwood which was not there 20 years ago. Several colonies were found of each of the following but each colony was restricted to plants of its own category. *Pyrola Asarifolia* which has suborbicular leaves broader than long, rounded or cordate at base and pink anthers; var. *ovata* which has similar leaves but longer than broad, rounded or occasionally narrowed at base, dull or but little glossy and anthers that are partly yellow. *Unifolium bifolium* and its variety *Canadense*. Mr. Billington of Detroit took us for a trip to his home town of Tecumseh on June 21. The day turned out to be a very wet one. *Arabis glabra* and *A. Canadensis* were collected in the region where *Viola dasyneura* Greene was originally collected but nothing of the latter was discoverable, even in fruit. A visit to Ypsilanti was made June 29 with the special object of ascertaining if *Hymenophyllum pubescens* and *Lepidium perfoliatum* had maintained their existence in that locality. Not a solitary sign of either one could be found. They had maintained a precarious foot hold on the railway for three or four years when improvements to the roadbed seems to have destroyed the stations for both species. They did not spread beyond the roadbed. On September 28 we botanized in the vicinity of Eames, a way station of the Grand Trunk Western in Orion Township of Oakland County. It was a wet day and we gathered in a considerable amount of rain. We came across two huge oaks lying upon the ground. These had been cut down recently, split open and cleaned of the honey that had filled their cavities. Bees were still hovering over their devastated homes.

Where the year of collection is not expressed, it is to be understood as 1927, and the collectors as O. A. Farwell and B. Gladewitz.

Botrychium multifidum (Gmel.) Rupr., var. *intermedium* (D. C. E.) Farwell. On thinly wooded hillsides at Ortonville. The fertile fronds had withered and fallen away, leaving only the sterile. No. 8129, September 21st.

Hippochaete laevigata (A. Br.) O. A. F., var. *Eatonii*

O. A. F. Railroad banks in Ypsilanti. *Stems annual*, more or less rough to the touch; spikes obtuse or barely apiculate. No. 7279, June 29th.

Hippochaete prealta (Raf.) O. A. F., var. *intermedia* (A. A. E.) O. A. F. Somewhat similar to the above and often confused with it; but the sheaths are black, becoming ashy with a black ring above and below, the spikes are sharply pointed, the stem walls are thicker, and the stems are perennial. On grassy slopes, roadsides, etc. Stony Creek, Monroe County, No. 8084, August 17th; Eames, No. 8139, September 28th.

Hippochaete prealta (Raf.) O. A. F., var. *scabrella* (Engelm.) O. A. F. Roadsides at Ortonville. No. 8119, September 21st.

Bromus ciliatus Linn, var. *purgans* (Linn) A. Gr., subvar. *laevivaginitus* (Wieg.) Farwell. In rich woods at Eames. No. 8146, September 28th.

Panicularia laxa Scribn. Manna Grass. Much like *P. Canadensis* but with oblong, fewer-flowered spikelets. Eloise, No. 8025, July 27th. Algonac, No. 8055, August 10th.

Asperella Hystrix (Linn) Humb. Porcupine Grass. Often 5 feet in height, but usually much lower. Near Farmington Junction there is an extensive wooded area where both this and the var. *Bigeloviana* occur; each, however, has its separate section and these do not overlap in so far as our observations could determine. Eames, No. 8143, September 28th. Farmington Junction, No. 8160, October 5th.

Asperella Hystrix (Linn) Humb., var. *Bigeloviana* Fernald. In a Cedar-Tamarack swamp at Washington, No. 8047, August 3rd. Farmington Junction, No. 8159, October 5th.

Lolium perenne Linn. Rye Grass. Some of the inflorescences are branched at the basal end, branches widely spreading, giving the inflorescence an ovate outline. A tendency toward var. *ramosum* Smith. Roadsides, etc., Detroit, No. 8054, August 10th.

Lolium multiflorum Lam. Some of the inflorescences branched at the basal end; branches erect and appressed. A tendency toward var. *ramosum* Guss. Vacant lots, etc., Detroit, No. 8053, August 10th.

Stipa spartea Trin. This species, also goes by the name of Porcupine Grass. Sandy grounds and roadsides at Whitmore Lake; No. 7948, June 15th.

Panicum miliaceum Linn. Roadsides at Rochester, No. 7588, August 26th, 1925. It has been observed at Oxford and at various other places.

Panicum virgatum Linn. Low grounds, usually in moist soil. Abundant in south-eastern Michigan. Ypsilanti, No. 6323, August 9th, 1922.

Panicum virgatum Linn, var. *elongatum* Vasey. Pannicle long and narrow. Ypsilanti, No. 6340, August 9th, 1922. Dundee, No. 5300, July 15th, 1919.

Panicum virgatum Linn, var. *Cubense* Griseb. Moist, gravelly soil along railways. Ypsilanti, No. 6803½, September 12th, 1923. Ann Arbor No. 8021, July 20th.

Panicum strictum Ph. Variable in the length of its fruit and in its pubescence which varies from glabrous to pilose. The fruit is acute in the type and obtuse in the varieties, one to two lines long. Chiefly it is a species of shaded places, but the last named variety is one of sunny situations. Port Huron, No. 4970, June 3rd, 1918. Algonac, No. 5498, June 20th, 1920. Portage Lake, No. 5850, June 12th, 1921. Goodison, No. 6504, June 6th, 1923. Rochester, No. 6959, July 9th, 1924.

Panicum strictum Ph., var. *linearifolium* (Scribn.) N. Comb. (*P. linearifolium* Scribn.) Bloomfield, No. 4998, June 29th, 1918. Washington, No. 5899, June 21st, 1921. Romulus, Nos. 6158 and 6159, June 7th, 1922. Ortonville, No. 6190, June 14th, 1922. East Lansing, No. 6540, June 9th, 1923. Metamora, No. 6652, July 15th, 1923. A variation of this with glabrous sheathes may be known as subvar. *Wernerii* (Scribn.) N. Comb. (*P. Wernerii* Scribn.) Grand Ledge, No. 6562, June 10th, 1923.

Panicum strictum Ph., var. *perlongum* (Nash) N. Comb. (*P. perlongum* Nash). Detroit, No. 5619, August 29th, 1920. Romulus, No. 6157, June 7th, 1922. Algonac, No. 2210, June 17th, 1925.

Panicum Bicknellii Nash, var. *Bushii* (Nash) O. A. F. This variety is characterized by the pilose sheaths (Bush No.

3246). Borders of upland woods near Dearborn. No. 4532a, July 14th, 1917, and Nos. 5598 and 5601a, August 15th, 1920. Sandy fields and roadsides at Algonac; No. 5497, June 20th, 1920.

Panicum dichotomum Linn. Usually in thin woods. Detroit, No. 4533a, July 14th, 1917. Bloomfield, No. 4999, June 29th, 1918. Royal Oak, No. 5583a, August 12th, 1920.

Panicum borcale Nash. In tall grass along the borders of a Tamarack swamp near Orion. Billington and Farwell, No. 5050, July 7th, 1918.

Panicum Lindheimeri Nash, var. *fasciculatum* (Torr.) Fernald. Usually a shade plant of sparsely wooded areas. Dearborn, Nos. 4512b and 4515a, July 8th, 1917; No. 4527a, July 14th, 1917. Newport, No. 6240, July 5th, 1922. A more rigid variation of sunny fields, etc., is subvar. *pilosum* (Torr.) N. Comb. (*P. Huachuchae* Ashe). Algonac, No. 5496, June 20th, 1920. Portage Lake, No. 5841, June 12th, 1921. Washington, No. 5885, June 21st, 1921.

Panicum Lindheimeri Nash, var. *Tennesseense* (Ashe.) N. Comb. (*P. Tennesseense* Ashe). Moist grounds and borders of woods. The leaves have a conspicuously white cartilaginous margin. Portage Lake, No. 5847a, June 12th, 1921.

Panicum Lindheimeri Nash, var. *implicatum* (Scribn.) Fernald. Panicle axis long pilose, the lower branches implicate. (*P. implicatum* Scribn.) Wet meadows, etc. Dearborn, No. 4514c, July 8, 1917. Pontiac, No. 5270a, June 29th, 1919. Ypsilanti, Nos. 5275 and 5281, July 13th, 1919. Washington, No. 5894, June 21st, 1921. A variation with the axis puberulent and the lower branches slightly or not at all implicate is subvar. *meridionale* (Ashe) N. Comb. (*P. meridionale* Ashe). Sandy clearings, etc., Detroit, No. 1614b, July 13, 1900. Parkdale, No. 5028, July 4th, 1918. Royal Oak, No. 5582, May 12th, 1920. Oxford, No. 5616a, August 22nd, 1920. Portage Lake, No. 5845, June 12th, 1921. Erie, No. 6993, July 30th, 1924.

Panicum precocius H. & C. A large stand of this species was found on dry grounds near Ann Arbor. It was in perfect condition. Fruits are 1 line long. No. 7991, June 29th.

Previously collected in Keweenaw County, No. 596 $\frac{1}{2}$, August 16th, 1888.

Panicum Tsugetorum Nash. In sandy grounds at Royal Oak, No. 5583, August 12, 1920.

Panicum sphaerocarpon Ell. Sandy grounds. Royal Oak, No. 5584, August 12th, 1920.

Panicum macrocarpon Torr. Dry, sandy soils. Lothrop, No. 4785a, October 21st, 1917. Rockwood, No. 4951, June 16th, 1918. Orion, No. 5051, July 7th, 1918. Ypsilanti, No. 5238, June 15th, 1919. Algonac, No. 5495, June 20th, 1920. Stony Creek, Monroe County, Nos. 5826, and 5827, June 9th, 1921. Romulus, No. 6160, June 7th, 1922.

Panicum latifolium Linn. Usually in more or less rocky or sandy woods. Dearborn, No. 4532b, July 14th, 1917. Royal Oak, No. 5584b, August 12th, 1920. Romulus, No. 6161, June 7th, 1922.

Cyperus esculentus Linn. Nut grass. Moist fields and often becoming a troublesome weed. It spreads rapidly through its nut-like tubers. The typical form with spikelets 1.5 lines broad has not been observed.

Cyperus esculentus Linn, var. *leptostachyus* Boeckl. A rare variation with long, narrow spikelets, .75 to 1.5 inches long. Birmingham, No. 5214, October 13th, 1918; Detroit, No. 1698, October 2nd, 1900.

Cyperus esculentus Linn, var. *angustispicatus*, Britt. The common variation of the species in southeastern Michigan. The spikelets are slender, the widest being not more than a line wide, generally only .5 to .75 of a line wide. Detroit (Palmer Park), No. 1573, September 8th, 1897, and (Oakwood) No. 5129, September 15th, 1918; Dearborn, No. 4659, September 29th, 1917; Junior, No. 5060, July 13th, 1918; Algonac, No. 7258, October 15th, 1924; Monroe Piers and shores of Lake Erie, No. 7801, September 8th, 1926.

Stenophyllus capillaris (L.) Britt. The typical form of the species. Sandy fields. Algonac, No. 8063, August 10th.

Scleria triglomerata Mx. Nut Rush. Low grounds at Stony Creek, Monroe County. Rather plentiful, No 8083, August 17th.

Carex Crawfordii Fernald. In moist ground. Keweenaw County, No. 602, September 12th, 1897.

Carex Crawfordii Fernald, var. *vicens* Fernald. In this the inflorescence is shortened and more crowded. Keweenaw County, No. 602a, August 12th, 1888.

Carex cristata Schw. Common and abundant throughout the state. Keweenaw County, No. 683a, September 15th, 1889. Ypsilanti, No. 683cc., July 23rd, 1891. Belle Isle, No. 683f, July 21st, 1892. Parkedale, Nos. 2787, June 30th, 1912, and 2866, July 14th, 1912. Rockwood, No. 4941, June 16th, 1918. South Rockwood, No. 5864, June 14th, 1921. Harris, Nos. 5068 and 5080, July 16th, 1918. Dearborn, Nos. 5022b, 5025c, and 5028hh, July 6th, 1918. Lakeville, No. 5315, July 20th, 1919. Almont, No. 6275a, July 19th, 1922.

Carex cristata Schw., var. *catelliformis* O. A. F. In low, moist grounds. South Rockwood, No. 5864, July 12th, 1921.

Carex cristata Schw., var. *ellipsoidalis*, O. A. F. Dearborn, No. 5022b, July 6th, 1918; Harris, No. 5080, July 13th, 1918.

Carex festucacea Schk. Spikes characterized by the prominently clavate bases. Port Huron, No. 4975a, June 23rd, 1918; Rockwood, No. 7931, June 8th.

Carex festucacea Schk., var. *echinodes* (Fernald) O. A. F. This variety has the tips of the perigynia conspicuously spreading. Trenton, No. 5784½, June 26th, 1921; Flat Rock, No. 7936, June 8th.

Carex festucacea Schk., var. *tenera* (Dew.) Carey. This variety has the spikes rounded at the base. Flat Rock, No. 7937, June 8th.

Carex brevior (Dew.) Mackenzie. In sandy but more or less moist grounds and associated with *C. cumulata*. Algonac, Nos. 3786 and 3793, July 26th, 1914, and No. 5498a, June 20th, 1920. In wet or dry grassy fields and thickets. Rockwood, No. 7935, and Flat Rock, No. 7947, June 8.

Carex brevior (Dew.) K.K.M., var. *pseudofestucacea* O. A. F. This is the *C. festucacea* of Gray's New Manuel, Mackenzie having shown that the name is untenable as used therein. Wet grassy grounds. Near Temperance, No 8004. July 13th. Also at Goodison, No. 7676, September 30th, 1925.

Carex Bicknellii Britt. In dry, sandy grounds at Fern-

dale. Previously reported as *C. alata*. Billington & Farwell No. 5578, August 12th, 1920.

C. straminea Willd., var. *alata* (Torr.) Bailey. On dry sterile hillsides in Keweenaw County. Mr. Mackenzie refers this to his *C. Merritt-Fernaldii*. No. 762, July 18th, 1890.

Carex cumulata (Bailey) K. K. M. In dry, yellow sand. Eloise, No. 8027, July 27. Previously I have found this carex at only three places, Algonac, Detroit, and Woodville. Detroit, No. 1870, September 9, 1904; Algonac, No. 2817, July 7th, 1912; No. 3690, June 21st, 1914; Nos. 5500a, 5500b, June 20th, 1920; Nos. 7257b, 7257c, October 15th, 1924; No. 7420½, June 17th, 1925. Undoubtedly belonging here is the Woodville collection, No. 5958, August 4th, 1921, previously reported as *C. straminea* Willd. It differs in having only three or four whitish, separated, strongly clavate-tapering spikes but the perigynia are distinctly those of this species.

Carex sparganioides Muhl., var. *lutca* O.A.F. In more or less exposed situations. Flat Rock, No. 7938, June 8th.

Carex aquatilis Wahl. Water Sedge. The typical form of this species is the variety *clatior* Bab. Similar to *C. stricta* Lam. but has larger and more club-shaped spikes of a much paler color and the leaf sheaths are not fibrillose. Near Whitmore Lake, No. 7966, June 15th. Also on Belle Isle, No. 1799, August 4th, 1903; Marl Lake, No. 4932, June 9th, 1918; Monroe Piers, No. 5481, June 3rd, 1920.

Carex aquatilis Wahl., var. *substricta* Kuken. This is the *C. aquatilis* of our manuals. Keweenaw County, No. 1676½, August 1900; Belle Isle, No. 1676¼, June 14th, 1901.

Carex aquatilis Wahl., var. *cuspidata* Laestad. This variety has very narrow, slender spikes with scales, more or less cuspidate, longer than the perigynia. Belle Isle, No. 1709, June 4th, 1901.

Carex aquatilis Wahl., var. *virescens* Anders. In this variety the scales are shorter, often hidden, and of the same color as the perigynia so as to be scarcely discernable. Belle Isle, No. 1917, June 24th, 1905.

Carex virescens Muhl. I have found this but once in Michigan. Keweenaw County, No. 697, September 20th, 1888.

Carex virescens Muhl., var. *Swanii* Fernald. A gigantic

form; culms 35 to 45 inches in length; much exceeding the leaves; the lowest bract, often the lowest two bracts leaf-like and exceeding the culm; spikes up to 10 lines or the terminal an inch in length and up to 3 lines in thickness; the perigynia typical for this variety. Eloise, No. 8026, July 27th. The commoner form, much shorter and more slender, with leaves usually longer than the culms, and with short setaceous bracts has been collected at Detroit, No. 1376, June 22nd, 1893; Algonac, No. 2819, July 7th, 1912; No. 2819a, June 20th, 1920; No. 4227, June 22nd, 1916; Dearborn, No. 4514, July 8th, 1917.

Carex umbellata Schk. Along the tops of rocky ledges at Grand Ledge. Culms few and only an inch or so long, staminate only for the most part; leaves about 6 inches in length. This species is rare in Michigan. No. 6557, June, 10th, 1923; also Keweenaw County, No. 737, July 7th, 1890; Orion, No. 737a, May 30th, 1895.

Carex umbellata Schk., var. *vicina* Dew. Culms prominent, 3 or 4 inches long with both staminate and pistillate spikes. Leaves much longer. In sandy woods near Eloise, No. 7890, May 11th. Also in Keweenaw County, No. 735, July 7th, 1890; Orion, No. 735a, May 30th, 1895.

Carex Richardsoni R. Br. A new station for this rare sedge was discovered near Rochester. It was associated with *Carex siccata* Dew. No. 7911 and *C. Pennsylvanica* Lam., No. 7912, on sandy hillsides not far from the interurban station called "Due West," No. 7910, June 1st.

Carex laxiflora Lam. In rich woods. Rockwood, No. 7926, June 8. A variety with shorter, thicker, fertile spikes is var. *gracillima* Boott. They pass gradually, one into another. Rockwood, No. 7923, June 8th. Another variety with broader leaves and the inconspicuous staminate spike hidden in the aggregated fertile ones is var. *blanda* (Dew) Boott. Rockwood, No. 7942, June 8th.

Carex riparia Curt., var. *pseudopaludosa* Schur. (*C. lacustris* Willd.) The lower-most leaves are reduced to bladeless, purple sheaths which become fibrillose. Growing along the shores of rivers, lakes, etc., always in water. Ypsilanti, No. 1167, July 18th, 1891; Detroit, No. 1167a, June 15th,

1893; Cass Lake, No. 4245, June 29th, 1916; Orion, No. 5057, July 7th, 1918; Monroe Piers, No. 5480, June 3rd, 1920.

Carex riparia Curt., var. *impressa* S. H. Wr. The lowermost sheaths are neither purple nor fibrillose and produce the normal leaf blade. Usually in places that may have water occasionally but are for the most part dry. Abundant along roadside ditches and in small depressions, from Rockwood to Flat Rock. No. 7922, June 8th. Also at Rochester, No. 4236, June 25th, 1916; Newport, No. 6227, July 5th, 1922.

Carex intumescens Rudge, var. *Fernaldii* Bailey. Associated with it were *C. intumescens* and *C. Grayi*. Rockwood, No. 7941, June 8th.

Arisaema triphyllum (L.) Torr., f. *viride* (Engler) O.A.F. South of Washington, No. 7905, May 18th, 1927; Rockwood, No. 7934, June 8th.

Juncus Greenei Oakes & Tuckerm. This is rather scarce, but seems to be well distributed. Algonac, No. 8067, August 10th; Monroe, No. 8098, August 17th.

Juncus Dudleyi Wieg. In a Tamarack swamp near Whitmore Lake, No. 7954, June 15th; Tecumseh, No. 7977, June 21st.

Juncus tenuis Willd., var. *Billingtonii* O.A.F. Wet grounds near Temperance, No. 8002, July 13th.

Juncus tenuis Willd., var. *uniflorus* O.A.F. Wet grounds near Temperance, No. 8003, July 13th.

Juncus brachycephalus (Engelm.) Buchn. Cedar swamps at Washington. No. 8046, August 3rd.

Juncus Canadensis J. Gay. Low fields at Algonac. No. 8069, August 10th. Monroe, No. 8094, August 17th.

Juncus Torreyi Coville, f. *brevipes* Farwell. Low grounds at Newport. No. 8077, August 17th. Also f. *longipes* Farwell, at Stony Creek. No. 8082, August 17th.

Juncus brachycarpus Engelm. Low grounds at Monroe. No. 8093, August 17th.

Juncoides pilosum (L.) Coville, var. *Michiganense* O.A.F. Near Farmington, No. 7882, May 8th, 1927; Wayne, No. 7894, May 11th.

Hemerocallis fulva Linn. Day Lily. This plant is well established in southern Michigan as an escape from cultivation.

It is seen in all sections along roadsides, on banks, etc. Detroit, No. 1637, June 27th, 1899; Farmington, No. 5089, July 14th, 1918.

Its near relative, *H. Lilio-Asphodelus* Linn, better known as *H. flava* Linn, has not been detected. Under the International Rules, *H. flava* must give place to the older name.

Lilium umbellatum Ph. Wood Lily. At this time of the year even the fruit had fallen, leaving only the foliaceous stem. Ortonville, No. 8130, September 21st.

Unifolium bifolium (L.) Greene. Often called Lily-of-the-Valley. Tamarack swamps near Whitmore Lake, No. 7959, June 15th. In the same locality is var. *Canadense* (Desf.) O. A. F. which is entirely glabrous, No. 7958.

Trillium grandiflorum (Mx.) Salisb. Wake Robin. In rich woods near Farmington Junction, No. 7865, May 8th, 1927; near Rochester, No. 7914, June 1st. Forma *roseum* O.A.F. The petals are very large and are colored magenta to dull majenta purple. In rich woods, near Rochester, No. 7915, June 1st. The white flowers of this species usually fade to a dirty white, rarely, with a tinge of pink. Those that are rose from the start fade to a darker rose. Forma *orbiculare*, O. A. F., No. 7866. Forma *spatulatum* O. A. F., No. 7873. Variety *obovatum* (Ph.) O. A. F. The petals are small, obovate, rosepink from the first, even in the bud. No. 7869.

Trillium lirioides Raf. No. 7871. Forma *albomarginatum* O. A. F., No. 7874. Forma *giganteum* O. A. F., No. 7872. Variety *longepetiolatum* O. A. F., forma *vegetum* O. A. F., No. 7870. Forma *subsessile* N. F. Leaves and peduncle sessile or subsessile, arising directly, or nearly so, from the rhizome, otherwise like f. *variegatum* into which it passes. No. 7881.

Trillium Chandleri O. A. F., f. *foliaceum* O. A. F., No. 7876. Forma *plenum* O. A. F., No. 7880. Forma *palaceum* O. A. F., No. 7868. A herbarium specimen of each of the above was collected at the new *Trillium* field near Farmington, May 8th, 1927. Mr. Ehlers collected the rhizomes of all, and one also of *T. Chandleri* f. *subulatum* for the University Botanical Garden. This second field is much more extensive

than the first one, but does not contain as wide a variety of forms.

Smilax herbacea Linn. Carrion Flower. Leaves smooth underneath. Scarce in this district. Eames, No. 8147, September 28th.

Quercus ellipsoidalis. E. J. Hill. Yellow Oak. Much like *Q. velutina*, but the elliptical, turbinate fruit distinguishes it from that. Roadsides at Eames, No. 8138, September 28th.

Polygonum amphibium Linn. The typical, aquatic European form of this species has received the varietal name *aquatica* Leys (1761) [var. *natans* Moench (1777)]. Leaves oblong-oval, acute or obtuse, cordate, spikes, ovoid or short cylindric. Margin of leaves, smooth or hispid. Very similar to the American plant but the leaves are generally cordate and the margins hispid; in the American plant the leaves are generally rounded or tapering at base with smooth margins. The leaf of the European plant frequently has a smooth margin and that of some forms of the American frequently is more or less hispid. There seems to be no specific distinction. But according to all accounts the European type is not found in America. The terrestrial type has been named var. *terrestre* Leyss. It has longer, narrower leaves, cordate but more acute, rough with a very short strigosity. The American representatives of the two above varieties are scarcely distinct, but as a matter of convenience may be maintained on the basis of the differences in the basal characters of the leaf blades, the European being cordate and the American rounded or tapering.

Variety *natans* Mx., Fl. Bor. Am. (1803) I 240. Not Moench (1777) which is var. *aquaticum*. Aquatic. Leaves narrowly oblong, tapering or round at both ends, margins smooth. Eloise, No. 8028, July 27th. This plant is typical var. *natans* floating on water with stems rooting at the bottom; it has sheaths without foliaceous borders. Some plants (No. 8028½) have stems which creep up the bank and trail over the ground. The stems on the ground send up erect branches of the usual terrestrial type, with borderless sheaths, or rarely, one or two sheaths may show a very small border. Keweenaw Co., No. 352, Sept. 4th, 1885; Detroit, No. 352b, Sept. 3rd,

1892; Lakeville No. 5322, July 28th, 1919; Drayton Plains, No. 6351, August 16th, 1922; Slocum's Island, No. 5977, August 31st, 1921. The terrestrial form of this is very similar to the variety *terrestre*, but has the leaves rounded or tapering at base and may be maintained as distinct on that character. It will be placed under var. *natans* as subvar. *terreum* N. Subvar. Terrestrial, leaves oblong-lanceolate, acuminate, rounded or tapering at base, stigose to nearly glabrous, sheaths without foliaceous border. Mostly sterile. Sanford in Rhodora (1925) XXVII 158 credits the true var. *terrestre* of Europe to Yarmouth, Nova Scotia, but the plant probably belongs here as var. *terrestre* is sterile and could not have been found in North America unless living plants had been brought over and transplanted, which is very unlikely. Probably belonging here also are *Persicaria abscissa* & *homalostachya* Green; *Polygonum amphibium* f. *terrestre* Blake. Eloise, No. 8029, July 27th. Near No. 8028, mentioned above. Perhaps derived from the same source but direct connection was not traced. Some of the stems had the lower leaves of the aquatic type and the upper of the terrestrial. Also, most of the sheaths were borderless, but a few had borders. One plant collected had but one bordered sheath on the middle of the stem. The occasional foliaceous border of the sheath shows the close connection of this with the variety *marginatum* into which it probably passes. Previously collected at Algonac, No. 3895, September 13th, 1914; Detroit, No. 5151, Sept. 20th, 1918; Hamburg, No. 6758, Sept. 5th, 1923; Sylvan Lake, No. 7279, October 22nd, 1924; Commerce, No. 7392, June 3rd, 1925; Whitmore Lake, No. 8017, July 20th.

Variety *marginatum* Farwell. Similar to var. *natans* Mx., but the sheaths have foliaceous borders. Aquatic. Rather scarce. Keweenaw Co., No. 351, Sept. 4th, 1885; Detroit, No. 351a, August 12th, 1892; Lakeville, No. 351b, September 2nd, 1901. The terrestrial form of this is common and abundant. It may be placed under var. *marginatum* as subvar. *Hartwrightii* (A. Gr.) N. Comb. (*Polygonum Hartwrightii* A. Gr., Proc. Am. Acad. (1870) VIII 294). Bloomfield, No. 5002, June 29th, 1918; Detroit, No. 5666, Sept. 7th, 1920; Lake Linden, No. 5963, August 10th, 1921; Slocum's Island,

No. 5987, August 31st, 1921; Commerce, No. 7393, June 3rd, 1925; Goodrich, No. 7649, Sept. 23rd, 1925; Parkedale, No. 3812, July 30th, 1914. A similar terrestrial form but with more shaggy pubescence may be called subvar. *hirtuosum* (Farwell) N. Comb. (*P. amphibium* var. *marginatum* f. *hirtuosum* Farwell, Pap. Mich. Acad. Sci. (1923) I 93.) Detroit, No. 5620, August 29th, 1920; Slocum's Island, No. 5978, August 31st, 1921; Flat Rock, No. 7458, July 1st, 1925. In the various forms dealt with above, we have had groups with glabrous spikes and with leaves of an oblong type, those of the aquatic forms being glabrous and those of the terrestrial being pubescent. In the following the spikes are glandular and the leaves are of an ovate type, otherwise not differing from the above.

Polygonum amphibium Linn, var. *coccineum* (Muhl.) Farwell. The type of Muhlenberg's *Polygonum coccineum* is the aquatic form, Willdenow's "*A aquaticum*." But this varietal name is in use for the typical form of the species so it can not be used here. Aquatic; leaves ovate, lanceolate, cordate; peduncles glandular. Sheathes not bordered. Whitmore Lake, No. 8011, July 20th. Previously collected at Detroit, No. 352a, September 3rd, 1892. The terrestrial form may be known as subvar. *emersum* (Mx.) N. Comb. [*Polygonum amphibium* var. *emersum* Mx., l. c.; *P. amphibium* var. *natans* f. *enersum* (Mx.) Farwell, Ann. Rept. Mich. Acad. Sci. (1920) XXI 365. *P. coccineum* f. *terrestre* (Willd.) Sanford, Rhodora (1925) XXVII 162]. Detroit, No. 1452, October 19th, 1893; Grosse Isle, No. 1452a, August 14th, 1909; Detroit (Oakwood), No. 4110, September 23rd, 1915; Birmingham, No. 5211, October 13th, 1918; Algonac, No. 5500½, June 20th, 1920; Detroit No. 5621, August 29th, 1920; La Salle, No. 5758, May 19th, 1921; and No. 6039, September 21st, 1921; Cass Lake, No. 7222, October 1st, 1924. Another form that combines both aquatic and terrestrial characters may be placed as subvar. *rigidulum* (Sheld.) N. Comb. (*Polygonum rigidulum* Sheld. Minn. Bot. Studies (1894) I 14.) In the early spring truly aquatic and floating in shallow water. After the water has dried up, the stems become erect and send out new branches which bear characteristic terrestrial foliage so

that late summer and autumn plants are bearing both aquatic and terrestrial types of leaves. Dearborn Nos. 7403, June 10th, 1925, and 7403a August 5th, 1925

Polygonum Lapathifolium Linn, var. *Salicifolium*, Sibth. Persicaria. In the typical form the flowers are rose. Low grounds at Lake Linden, No. 8111, September 2nd, 1925. A variation having white and rose flowers variously mixed or having some spikes with all the flowers white may be known as forma *pallidum* N. F. Low grounds at Lake Linden, No. 8112, September 2nd, 1925.

Polygonum Lapathifolium Linn, var. *incanum* (Roth) Koch. Green flowers and fruits larger than in those of the preceding forms; all leaves white tomentose beneath except the uppermost in luxuriant specimens which become glabrate or glabrous. With the preceding forms, No. 8113. The variety *tomentosum* (Schrank) Schuster differs in having greenish-white or white flowers instead of green; in being more robust; and in having only the lowermost leaves tomentose beneath. Farmington Junction, No. 8157, October 5th.

Chenopodium Ambrosioides Linn. Spikes densely flowered and copiously leafy. Detroit, No. 5136, September 15th, 1918, and 8163, October 12th, 1927.

Chenopodium Ambrosioides Linn, var. *anthelminticum* (Linn) A Gr. Spikes more slender, leafless. Detroit No. 8162, October 12th, 1927.

Silene antirrhina L., f. *bicolor* N. F. Sleepy Catchfly. Flowers white ventrally, pink dorsally. Open in cloudy, dark weather. The typical form of the species is said to open for a short time, only during sunshiny weather. Plentiful at Flat Rock, No. 7945, June 8th.

Melandryum album (Mill.) Garcke. White Campion. This is a common weed in south-eastern Michigan. The flowers are white or tinged with pink, open around 5 or 6 o'clock in the evening and remain open until 9 or 10 o'clock the next morning. This species is said to have teeth of capsule erect but in Michigan plants they are recurved as in *M. dioica* (L.) Schinz & Thell. Styles five or more. Carpels usually five, two, often three, toothed. Whitmore Lake, No. 8006, July 20th. Washington, No. 8036, August 3rd. Algonac, No. 8060,

August 10th. Previously it has been collected at Detroit, No. 1462, June 22nd, 1894; Ypsilanti, No. 3811, July 30th, 1914; Parkedale, No. 3870, September 7th, 1914; Royal Oak, No. 5587d, August 12th, 1920; Ortonville, No. 6178, June 14th, 1922; Utica, No. 6298, August 2nd, 1922; Farmington Junction, No. 7630, September 9th, 1925.

Melandrium noctiflorum (L.) Fries. Catchfly. Similar to the above but the styles and carpels are three. Flowers white or pink, opening and closing as noted for the preceding species. Lake Linden, No. 8101, August 24th, 1927. Previously collected in Keweenaw County, No. 251, July 5th, 1885. Ypsilanti, No. 251a, June 25th, 1891. Detroit, No. 251b, September 16th, 1892 and No. 2497, September 7th, 1911. Parkdale, No. 2922, July 28th, 1912. Anchorville, No. 6408, September 27th, 1922.

Ranunculus carecitorum Greene. This Swamp Buttercup usually is found on low, wet, more or less wooded and swampy grounds through which a small stream winds its devious way. It probably is the largest (two and one quarter inches across) flowered species of this group. The petals are oblong to round, obovate, some fully an inch long. The large, deltoid root leaves are ten or eleven inches wide and long. More or less rough pubescent. Due West, a stop station on the inter-urban line, No. 7915, June 1st.

Anemone cylindrica A. Gr., f. *albida* O. A. F. Sepals thin and white, no tinge of greenish. Banks and hillsides at Ypsilanti, No. 7983, June 29th.

Hepatica acutiloba DC., var. *variegata* N. Var. The leaves are mottled dark green and light green. Analogous to the next variety described but have not seen the brown marking in this. Frequently met with along with the typical form of the species. Rockwood, No. 7932, June 8th.

Hepatica Americana (DC.) Ker., var. *maculata* N. Var. The leaves are beautifully mottled brown and green. In a wet open piece of woods near Wayne. Quite plentiful. The normal green leaved form, the specific type, was not seen. The mottling is permanent but on some leaves the coloring is a contrast of dark and light greens and the brown may fade in drying towards olive. No. 7893, May 11th.

Thlaspi arvense Linn. Penny Cress. The lowermost or basal, oblanceolate, petioled leaves of this species are seldom seen on herbarium specimens as they are early deciduous and usually have fallen by the time the plant begins to bloom. Detroit, No. 2054, July 8th, 1908, and No. 7921, June 2nd, 1927; Ysantilanti, No. 5450, May 30th, 1920; S. Rockwood, No. 5870, June 14th, 1921; Brighton, No. 7701, May 5th, 1926.

Sinapis arvensis Linn, f. *stricta* (Celak.) Thell. A form of the Charlock with the pods appressed to the rachis. Lake Linden, No. 8114, September 3rd, 1927.

Arabis lyrata Linn. Rock Cress. Typical specimens of this species have been collected on rocky shores and hills in Keweenaw County. It is distinguished from the variety by its more slender, tapering style or beak. No. 154, August 1st, 1884, and No. 154a, September 12th, 1887.

Arabis lyrata Linn, var. *intermedia* (DC.) O. A. F. This is distinguished from the species by its thick, cylindrical, non-tapering style, little if any narrower than the width of the pod; in the typical form of the species the stigma is much wider than the style and overhangs it but in this variety the style is as wide as the stigma. The old stems of the preceding year some of them with remnants of the fruits, are persistent into the flowering season, thus proving the plant to be a perennial in this region. Due West, No. 7909, June 1st. Previously collected at Rochester, No. 1533½, July 4th, 1896; near Washington, No. 4158, May 25th, 1916.

Arabis glabra (L.) Bernh. Tower Mustard. Tecumseh, No. 7978, June 21st. In more or less rocky situations throughout the state but nowhere frequent. Also at Detroit No. 1455, June 15th, 1894; Keweenaw County, No. 1455a, June 28th, 1895; Rochester, No. 3664, June 11th, 1914; Royal Oak, No. 4208, June 17th, 1916; Woodville, No. 5960, August 4th, 1921; Grand Ledge, No. 6570, June 10th, 1923; Parkedale, No. 6951, July 2nd, 1924; S. Rockwood, No. 4943, July 16th, 1918.

Arabis Canadensis Linn. Sickie Pod. In the same situations as *A. glabra* and equally infrequent. Tecumseh, No. 7975, June 21st, 1927. Also at Detroit, No. 1571, September 8th, 1897; Island Lake, No. 1571a, July 16th, 1905; Rochester, No. 3665, June 11th, 1914; Ysantilanti, No. 5244½, June

15th, 1919; Franklin, No. 5520, June 24th, 1920; Hambrug, No. 6264, July 12th, 1922; Parkedale, No. 6950, July 2nd, 1924; Redford, No. 4750, October 14th, 1917.

Arabis laevigata (Muhl.) Poir., var. *heterophylla* O.A.F. Hillsides near Temperance, No. 7996, July 13th.

Geum vernum (Raf.) T. & G. Spring Avens. Frequent in thin woods at Rockwood. No. 7940, June 8th.

Geum macrophyllum Willd. In thin woods at Eloise, No. 8022, July 27th.

Rubus neglectus Peck. Purple Raspberry. Robust specimens in a Tamarack swamp in mature fruit. Fruits large, red, and of excellent flavor. Stems four or five feet high, and curving over, and rooting at the tip. Washington, No. 8042, August 3. Nos. 5713 and 7836 referred here with much misgiving in the preceding number of this series, undoubtedly are *R. melanolasius* Focke.

Rubus Allegheniensis Porter. Blackberry. A plant of the uplands, open fields, and sunny places. Stems and glands red; inflorescence racemose; fruit dry, aromatic, narrowly oblong or cylindrical. Detroit, No. 1976, June 18th, 1906. Rochester, No. 1976a, June 8th, 1909. Eloise, No. 8031, July 27th. Wayne, No. 8035, July 27th.

Rubus Allegheniensis Porter, var. *nigrobaccus* (Bailey) N. Comb. (*R. nigrobaccus* Bailey). Stems purplish, glands black; fruit juicy, sweet, not at all aromatic, hemispherical to thimble-shaped. Usually in thin woods. A plant of shady places. The plant with sweet, juicy fruit and black glands certainly should be recognized as distinct from the one with aromatic fruit and red glands. Our commonest blackberry. Detroit, No. 1365, June 10th, 1893. Whitmore Lake, No. 7965, June 15th. Ypsilanti, No. 7985, June 29th. A variation of this with corymbiform inflorescence may be known as subvar. *sativus* (Bailey) N. Comb. (*R. villosus* var. *sativus* Bailey.) Fence rows and borders of small thickets. Royal Oak, No. 2127, August 24th, 1909. Ypsilanti, No. 7984, June 29th. Eloise, No. 8032, July 27th.

Rubus flavianus Blanchard. In thin woods at Palmer Park, Detroit, No. 2097, July 31st, 1909.

Rubus permixtus Blanchard. In similar situations as the preceding. Rochester, No. 2100, August 13th, 1909.

Rubus argutus Link. (*R. Andrewsianus* Blanchard). Dry, sandy grounds. Detroit, No. 2022, June 16th, 1907. Parkdale, Nos. 2867, July 14th, 1912 and 3427, June 8th, 1913.

Rubus frondosus Bigel. Rocky hillsides. Cliff Mine, 183a, June 20th, 1885; Whitmore Lake, No. 8019, July 20th.

Rubus pergratus Blanchard. Banks, etc. Alexis, Ohio, near the State boundary. No. 6497, May 30th, 1923.

Rubus Canadensis Linn. (*R. Millspaughii* Britt.) Smooth, not prickly; open, sunny fields among rocks. Cliff Mine, No. 183b, June 28th, 1895.

Rubus elegantulus Blanchard. Somewhat similar to the last, but slightly prickly. Cliff Mine, No. 184, August 22nd, 1884, and No. 3064, August 22nd, 1912.

Rubus Baileyanus Britt. Dewberry. Trailing. Leaves pubescent. Stony Creek, Oakland Co., No. 3439, June 8th, 1913; Algonac, No. 3693, June 21st, 1914, and 3800, July 28th, 1914; Belle Isle, No. 1292, August 6th, 1892; Keweenaw Co., No. 1292a, August, 1900.

Rubus flagellaris Willd. Leaves glabrous, or nearly so, inflorescence corymbose. Keweenaw Co., No. 183, August 22nd, 1884. Palmer Park, No. 183c, July 4th, 1896. Rochester, No. 2957, July 28th, 1912; No. 2974, August 4th, 1912; No. 3220, October 21st, 1912. Royal Oak, No. 5587a, August 12th, 1920. Algonac, No. 3692, June 21st, 1914; No. 3799, July 26th, 1914.

Rubus procumbens Muhl. (*R. subuniflorus* Rydb.) Flowers usually solitary. Royal Oak, No. 5587b, August 12th, 1920.

Rubus Enslenii Tratt. Growing on sand. Rochester, No. 1541, July 4th, 1896. Detroit, No. 1541a, May 26th, 1898. Rochester Nos. 2603, June 2dn, 1912 and 2871, July 4th, 1912. Stony Creek, Oakland Co., Nos. 3440 and 3447, June 8th, 1913. Woodbridge Park, No. 5804, May 30th, 1921.

Rubus nigricans Rydb. Low grounds. Keweenaw Co., No. 1734, August 15th, 1901. Palmer Park, No. 1734a, July 31st, 1909.

Rubus hispidus Linn. Swamp Dewberry. Detroit, No.

1387, July 3rd, 1893. Parkedale, No. 3055a, August 4th, 1912. Ferndale, No. 3182, August 14th, 1912. Algonac, Nos. 3691, June 21st, 1914 and 3798, July 26th, 1914. Dearborn, No. 4512c, July 8th, 1917.

Pyrus coronaria Linn. Crab Apple. This species has many varieties due to the variations in leaf cutting and pubescence. Sargent took as the type a form with unlobed, evenly serrate leaves. But Linn described his species with leaves "serrato-angulosis." We must therefore look for a variation with lobed ("angulosis") leaves when delimiting the type form. Such a form is found in variety *elongata* (Rehder) Bailey and this variety must be considered as the trinomial type of the species. Just as good reasons may be advanced for taking *P. glaucescens* for the typical form of the species but less confusion may arise if the lobed form of the current understanding of *P. coronaria* be designated. The form adopted by Sargent as the type (*Malus coronaria* L. [sic] in Manual of the Trees of N. Amer. [1922] 382, fig. 339) may be known as *Pyrus coronaria* Linn, var. *fragrans* (Rehder) N. Comb. (*Malus fragrans* Rehder). The above variations with glabrous calyx tubes and green leaves I have not found in Michigan. All that I have observed have a tomentose calyx tube and mature leaves thick and glaucescent beneath. It has always been reported as *P. coronaria*; it may be more appropriately known as *Pyrus coronaria* Linn, var. *tomentella* N. Var. (*Malus glaucescens* Rehd.) The varital name refers to the tomentose condition of the calyx tube at flowering time. Eames, No. 8142, September 28th. Previously collected on Belle Isle, No. 1353, May 27th, 1893, and at Parkedale, No. 3347, May 11th, 1913.

Crataegus pruinosa (Wendl.) C. Koch. Along fence rows at Eames, No. 8141, September 28th. Farmington Junction, No. 8154, October 5th.

Crataegus alnorum Sarg. Small shrubs with well matured fruit. Ortonville, No. 8120, September 21st.

Crataegus coccinea Linn. (*C. pedicellata* Sarg.) Some of the leaves are broad enough to be called transversely elliptical. Ypsilanti, No. 5454, May 30th, 1920.

Crataegus tomentosa Linn. Abundant in Southeastern

Michigan. Fruit globular, dull, becoming brighter red, 3 or 4 lines in diameter. Farmington Junction, No. 8155, October 5th. Previously collected on Belle Isle No. 1078a, May 27th, 1893; at Orion, No. 1078c, May 30th, 1895; Parkedale, No. 3550, October 5th, 1913; Northville, No. 6456, October 18th, 1922.

Crataegus tomentosa Linn, var. *structilis* (Ashe) N. Comb.. *C. structilis* Ashe. Fruit larger, more succulent, often somewhat flask-shaped, usually of a brighter red, less frequent. Farmington Junction, No. 8153, October 5th. Previously collected on Belle Isle, No. 1712, June 9th, 1901; and No. 1885, October 18th, 1904; at Parkedale, No. 3227, October 27th, 1912; and No. 4418, September 3rd, 1916.

Chamaecrista fasciculata (Mx.) Greene. Partidge Pea. A single low specimen of this species was gathered by Mr. Gladewitz on our excursion to Monroe, August 17th. It was just outside of the northern city limits of Monroe on the right-of-way of the electric interurban service. No other specimen was observed.

Trifolium pratense Linn. Red Clover. Naturalized from Europe. Probably also native. I can see no real reason for not considering this species native as well as *T. repens*. Differs from the next species in its solid stems and appressed pubescence below the flower-head. Pubescence in this species brownish, in the next white. Lake Linden, No. 8098, August 23rd, 1927. Calumet No. 8099, August 24th, 1927.

Trifolium Pensylvanicum Willd. (*Trifolium pratense* L., var. *sativum* Schreb.; *T. pratense* American authors at least in part not Linn.) Red Clover. Cultivated and naturalized everywhere. Keweenaw County, No. 109, June 26th, 1884; Ypsilanti, No. 109a, June 21st, 1892. Detroit, No. 109b, August 4th, 1892; Rochester No. 2667, June 11th, 1912; Parkedale, No. 2944½, July 28th, 1912. Forma *albiflora* N. F. Flowers white often turning pink as they age. Keweenaw County, No. 110, June 26th, 1884; Monroe, No. 5914b, July 6th, 1921; Metamora, No. 6647, July 18th, 1923; Washington, No. 8037, August 3rd; Newport, No. 8075, August 17th.

Amorpha fruticosa Linn. False Indigo. A lone shrub was discovered by Mr. Gladewitz. It is on the banks of the Huron

between Ann Arbor and Geddes. So far as we are aware, this is the first time this species has been found in and reported for Michigan. No. 7990, June 29th.

Amorpha canescens Ph. Leadplant. Detroit, No. 1544, July 23, 1896; Galesburg, No. 5557, July 20th, 1920.

Lathyrus sylvestris Linn, var. *Wagneri* A. Schwartz. This was cultivated many years ago as a forage plant but its use for this purpose was long since discontinued. It escaped to roadsides and now in one place forms a fairly thick hedge about 40 yards long by 10 feet wide. Also along fences. It is still spreading. Near Temperance, No. 7999, July 13th.

Linum sulcatum Ridd. Wild Flax. Grassy fields. A good sized stand of it. Ortonville, No. 8132, September 21st. Island Lake, No. 1802a, July 16th, 1905.

Linum medium (Planch.) Britt. First collected on Belle Isle, No. 1802, July 8th, 1903. Roadsides near Royal Oak where rather abundant. No. 5587, August 12th, 1920.

Linum Virginianum Linn. A good stand of this was found on a grassy bank near Wayne. No. 7842½, September 10th, 1924.

Oxalis stricta Linn. Yellow Sorrel. *O. cymosa* Small. This species is frequent throughout southeastern Michigan. The typical form has an essentially glabrous stem. Several variations were found at or near Stony Creek in Monroe County, August 17th, No. 8086. A variety has villous stems and may be known as *O. stricta* var. *villicaulis* (Wieg.) N. Comb. *O. Europoea* f. *villicaulis* Wieg. Rhodora (1925) XXVII 135. No. 8088. Also var. *rufa* (Small) Farw. with reddish purple foliage, No. 8087. And var. *Bushii* (Small) Farw. with the upper surface of the leaflets strigose. No. 8089.

Oxalis Dillenii Jacq. With the preceding. No. 8090.

Polygala polygama Walt. Bitter Milkwort. Rather scarce. Island Lake, No. 1929, July 16th, 1905. Algonac, No. 2824, July 7th, 1912; and No. 2824a, June 17th, 1925. There is a variation with stems widely spreading but not prostrate, bearing from the axils of many leaves reflexed branches with terminal racemes of cleistogamous flowers. These racemes point earthward but do not penetrate the ground. This may

be called variety *ramulosa* N. Var. In sandy soil at Algonac. No. 8068, August 10th.

Polygala sanguinea L. Purple Milkwort. Rather common but not abundant. This species has three color forms, purple, white and an intermediate form. Linn described the first as *P. sanguinea* and the last as *P. viridescens* which may be known as *P. sanguinea* f. *viridescens* (L.) N. Comb. I have collected the typical form (f. *typica*, N. F.) with purple flowers, at Ypsilanti, No. 1198, August 12th, 1891. Detroit, No. 1198a, July 18th, 1893. Algonac, No. 3785, July 26th, 1914. Anchorville, No. 6395, September 27th, 1922. Algonac, No. 8060, August 10th. Forma *viridescens* (Linn) O.A.F., has some of the flowers greenish white and others the same with an added purplish tinge. Detroit, No. 1641, June 30th, 1899; Algonac, No. 3784, July 26th, 1914, and No. 8070, August 10th. Forma *albescens*, N. F. Flowers white, the standard with a midrib green for .5 to .75 of its length. Algonac, No. 8066, August 10th. Previously at Detroit: No. 1482 $\frac{1}{2}$, September 6th, 1894; No. 1622 $\frac{1}{2}$, September 20th, 1898; No. 1641 $\frac{1}{2}$, June 30th, 1899.

Euphorbia dentata Mx. Annual. Rather scarce in Michigan. Generally in rather poor soil. Newport, No. 8074, August 17th..

Impatiens Balsamina Linn. Garden Balsam. Waste grounds at Farmington, No. 8161, October 5th.

Hypericum Ascyron Linn. Low grounds near Whitmore Lake. Scarce. No. 8010, July 20th. Ortonville, No. 8135, September 21st. Previously collected in Keweenaw Co., No. 718, August 20th, 1889, and at Birmingham, No. 718a, September 27th, 1898.

Lechea Leggettii Britt. & Holl. Low grounds at Monroe. No. 8096, August 17th.

Viola Missouriensis Greene. This species is quite common in moist thickets. Due West, No. 7916, June 21st. Also at Inkster, No. 7346 $\frac{1}{2}$, May 20th, 1925; Eloise, No. 7353, May 20th, 1925; Algonac, No. 7427, June 17th, 1925.

Viola peramoena Greene. One of our most beautiful violets. Stems caespitose in large clumps. Near Washington, No. 7901, May 18th, 1927.

Viola vagula Greene. In this species, the presummer leaves are always strongly purple underneath. It usually grows in wet marshy grounds, but I have seen it growing on coal cinders. Near Oxford. Nos. 6887, 6888, and 6893, June 4th, 1924; Parkdale, No. 2550a, May 25th, 1913; Rochester, No. 6871a, May 14th, 1924.

Viola nephrophylla Greene. Near Erie, in low, moist grounds between the horns of a more or less crescent shaped ridge. No. 7857, May 5th. Also, Nos. 6878 and 6885, May 21st, 1924.

Viola nephrophylla Greene, f. *albinea* N. F. Flowers white except for purple veins on the spurred petal. Dr. Brainerd called this *V. papilionacea*, an *albino*, yet called No. 6878 *V. nephrophylla*. But there is absolutely no difference between the two except in the color of the petals; if one is *V. nephrophylla*, then the other is also. With the above, No. 7859, May 5th. Also, No. 6881, May 21st, 1924 and No. 5725, May 10th, 1921, from the same station, the latter number having been reported as *V. Missouriensis*.

Viola nephrophylloides N. Sp. Leaves ovate, cordate, mostly obtuse, crenate, deeply toothed near the base; intermediate in character between *V. fimbriatula* and *V. nephrophylla*, with both of which it is associated. Dr. Brainerd considered it to be a new hybrid (*V. fimbriatula* X *nephrophylla* Brainerd, in litt.) See illustrations. No. 7858, May 5th; also, No. 6877, May 21st, 1924.



VIOLA NEPHROPHYLLOIDES N. Sp.



VIOLA NEPHROPHYLLOIDES N. Sp.

Viola emarginata (Nutt) Le Conte. This species in its typical form with glabrous, deltoid leaves, apparently is not known from Michigan. Our plant is more or less pubescent and ciliate, but the late Dr. Greene said it was nevertheless this species. First collected at Detroit; No. 862a, May 1st, 1896; No. 1603, May 14th, 1898; No. 1772½, May 19th, 1902; No. 1603b, August 29th, 1920; No. 1603c, May 8th, 1921. Romulus, No. 6162, June 7th, 1922. Royal Oak, No. 4211a, July 13th, 1916, and No. 4211, June 18th, 1916. Algonac, No. 3643, May 24th, 1914; No. 3643a, August 10th.

Viola fimbriatula Sm. A low plant with the short petioled, pubescent, broadly ovate leaves in a rosette. The upper surface of the leaves are more or less shiny. Midsummer plants essentially the same, the petioles remaining much shorter (2-3 the length of the blade or less) than the ovate-lanceolate blades (which are 1.5 by 3.75 inches). Detroit, No. 862, May 1st, 1896; No. 1603a, May 6th, 1907. Algonac, No. 2584, May 27th, 1912; No. 2584a, June 17th, 1925; No. 3642, May 24, 1914. Eloise, No. 7362, May 20th, 1925; No. 7362a, June 10th, 1925; No. 7362b, May 11th, 1927; No. 7888, May 11th, 1927; No. 7888a, July 27th, 1927; Wayne, Nos. 7891 and 7896, May 11th, 1927; No. 7891a, July 27th, 1927. Another form has fewer leaves, not in a rosette, these narrowly ovate to oblong, and not shiny above; the summer leaves are ovate to oblong and obtuse to narrowly triangular and acute on very long petioles as long as, or longer than the blades. It is this form (No. 6880) that Dr. Brainerd considered to be one parent of a new hybrid of *V. nephrophylla*. The summer stage resembles very much that of *V. subsagittata*. Near Erie; No. 6880, May 21st, 1924; No. 6880a, July 30th, 1924; No. 6884, May 21st, 1924; No. 7856, May 5th, 1927; No. 7992, July 13th, 1927. Temperance, No. 7855, May 5th, 1927; Monroe, No. 7307, April 29th, 1925, and No. 7307a, August 17th.

Viola fimbriatula Sm., f. *albescens* N. F. Like the narrow leaved form above, but the flowers are white except for the spur tip and the purple veins of the lower petals. Erie, No. 7860, May 5th.

Viola blanda Willd. White Violet. A conspicuous plant in the midsummer woods at Washington. No. 8043, August 3rd.

This is the summer stage of No. 6485, May 23rd, 1923.

Viola pubescens Ait., f. *eriocarpon* (Nutt.) O. A. F. Pittsfield, No. 6211, June 28th, 1922.

Viola pubescens Ait., var. *scabrinscula* (Schw.) T. & G. Near Farmington, No. 6151, May 23rd, 1922. Forma *leiocarpa* (Fern. & Wieg.) O. A. F. In rich woods near Farmington. No. 7877, May 8th, 1927 (flowers bright yellow), and No. 7879 (flowers pale yellow or cream color). Near Farmington, No. 6150, May 23rd, 1922. No. 7879 is the pale flowered segregate named by Dr. Greene, *V. achlydophylla*.

Viola striata Ait. Low grounds in sparse woods. Eloise No. 7883, May 11th.

Viola striata Ait., f. *albiflora* N. F. Flowers white, without purple veins. Perhaps the *Viola albiflora* Link, Enum. (1821) I, 241. Eloise, No. 7884, May 11th.

Viola tricolor Linn. Pansy. Along the shores of Torch Lake at Lake Linden. Scarce. No. 8105, August 28th, 1927.

Ludwigia alternifolia Linn. Seedbox. Low grounds at Monroe. No. 8097, August 17th.

Angelica atropurpurea Linn. Angelica. Low, moist grounds at Geddes. No. 7989, June 29th. Collected previously at Dundee, No. 5291, July 15th, 1919; Monroe, No. 5809, June 2nd, 1921.

Pyrola Asarifolia Mx. Wintergreen. Near Whitmore Lake, No. 7960, June 15th.

Pyrola Asarifolia Mx., var. *ovata* Farwell... Near Whitmore Lake, No. 7961, June 15th.

Nummularia hybrida (Mx.) N. Comb. *Lysimachia hybrida* Mx. Fl. Bor. Am. (1803) I, 126. Loosestrife. Eloise, No. 8024, July 27th. Previously collected at Detroit, No. 1511, June 30th, 1896.

Nummularia lanceolata (Walt.) O. K. Differs from the above in its much smaller and shorter leaves and in its longer pedicels which in this species are longer than the bracts and in the nearly entire corolla lobes. Detroit, No. 1843, August 13th, 1904.

Asclepias purpurascens Poir. Rare. Roadsides near Temperance, No. 7997, July 13th.

Asclepias verticillata Linn. No. 6648 reported on p. 275,

Vol. 8 of this journal had the stems tufted, bearing filiform-linear leaves about two inches long by .5 of a line wide; these were very numerous, erect, forming a dense mass of foliage. Stems 2—2.5 feet in height. This probably is the typical form of the species. Another form has single stems bearing few, spreading, longer and broader leaves, about 2.75 inches by 1.5 lines. This probably is var. *linearis* (Scheele) Pollard. Ortonville, No. 8133, September 21st.

Ascerates Floridana (Lam.) Hitchc. Near Temperance, rare. No. 8001, July 13th.

Volulus sepium (L.) Junger. Hedge Bindweed. Flowers pure white. Fields at Superior, No. 7988, June 29th; near Whitmore Lake, No. 8012, July 20th.

Phlox divaricata Linn. f. *albiflora* O. A. F. Associated with the specific type (bluish or lilac) and the forma *purpurea*. Although the flowers are pure white when fresh, yet in drying they become more or less bluish. Rockwood, No. 7924, June 8th.

Mentha piperita, Linn. Peppermint. Largely cultivated in southern Michigan for the production of oil. It is found as a naturalized plant throughout Michigan. The typical form of the species is glabrous, and is the form described by Sole in 1798 as var. *officinalis*. It is in use by those who prefer a trinomial name for the specific type. Detroit, No. 1806, July 18th, 1903; Keweenaw Co., No. 284½, July 26th, 1885.

Mentha piperita Linn, var. *sylvestris* Sole. This is a variation that is more or less pubescent on the leaf petioles, etc., and is the variety *subhirsuta* Benthams. The older name of Sole should supercede the later one of Benthams. It is far less frequent than the typical form of the species. Keweenaw Co., No. 347, Sept. 4th, 1885; Birmingham, No. 347a, Sept. 27th, 1898.

Pentstemon hirsutus (L.) Willd., f. *albiflorus* O. A. F. This white flowered form of the species is quite plentiful at Flat Rock. No. 7943, June 8th.

Pedicularis Canadensis Linn. Mant. (1767) I, 86. Linn based his species upon plants collected in North America by Kalm and described it with white flowers (*Corallae albae*). Thus the typical form (forma *typica*, N. F.) is white flower-

ed. In *Rhodora* (1814) XVI, 128, Mr. A. H. Moore described the red flowered form as forma *preclara*. There are two other color forms: one with the upper lip and dorsal parts yellow, and the lower lip and ventral parts paler or cream color (f. *flava*, N. F.); and one with the upper lip and dorsal parts red and the lower lip and ventral parts yellow (f. *bicolor*, N. F.)

Pedicularis Canadensis L., f. *typica*. Not seen as yet in Michigan. Forma *praeclara*, A. H. More. The lower lip is red but very much paler than the upper. Near Farmington Junction, No. 7875, May 8th, 1927; Wayne, No. 7898, May 11th. Forma *flava*. Near Farmington Junction, No. 7876, May 18th, 1927; Wayne, No. 7897, May 11th. Forma *bicolor*. Near Farmington Junction, No. 7878, May 8th, 1927; Wayne, No. 7899, May 11th.

Plantago Rugellii Dec. Our common native Plantain with glabrous foliage and purple petiole bases. Wayne, No. 8034, July 27th. Abundant throughout the State. Previously collected on Belle Isle, No. 1331, September 7th, 1892. Detroit, No. 2519, September 14th, 1911. Parkedale, No. 2990, August 4th, 1912.

Plantago Rugellii var. *asperula* Farwell. Has more or less roughish pubescent foliage and scapes. Wayne, No. 8033, July 27th.

Galium Labradoricum Wieg. This was growing in profusion near Whitmore Lake. No. 7952, June 15th.

Viburnum Acerifolium Linn, var. *ovata* Rehder. Arrowwood. Nearly all the leaves are entire, but two or three are typically lobed as in the specific type. Tecumseh, No. 7971, June 21st.

Viburnum affine Bush. This has been reported heretofore as *V. dentatum*, which species in so far as my knowledge goes is not found in Michigan. Parkedale, No. 3406, May 25th, 1913; and No. 4187a, June 11th, 1916; Rochester, No. 3920, October 25th, 1914, and No. 4417a, September 3rd, 1916; Pittsfield, No. 5740, May 15th, 1921.

Viburnum affine Bush, var. *hypomalacum* Blake. This has been reported heretofore as *V. pubescens*, which name is now transferred to another species than the one for which it has stood for a century or more. Whitmore Lake, No. 7967, June

15th. Previously collected in Keweenaw Co., No. 394, June 30th, 1886; Orion, No. 394a, August 29th, 1895; Birmingham, No. 394b, September 9th, 1897; Parkedale, No. 2620, June 2nd, 1912, No. 2639, June 9th, 1912, and No. 3419, June 8th, 1913; Detroit, No. 3416½, May 31st, 1913; Pittsfield, No. 5743, May 15th, 1921, and No. 6212a, June 28th, 1922.

Callistemma hortense Cass. China Aster. Waste grounds at Farmington Junction. Scattered over considerable territory. No. 8151, October 5th.

Erigeron Philadelphicum Linn. In fields and open woods. Rockwood, No. 7927, June 8th. Previously in Keweenaw Co., No. 477a, July 28th, 1887; Ypsilanti, No. 477b, June 21st, 1892; Detroit, No. 477c, June 8th, 1893; Parkedale, No. 2772, June 30th, 1912.

Erigeron Philadelphicum Linn, f. *purpureum* (Ait.) N. Comb. (*E. purpureum* Ait.) The ligulate flowers are a deep rose purple. In the typical species they are pale pink or whitish. If color forms are worth naming, this one certainly deserves recognition. The earlier botanists even went so far as to consider it a distinct species. Rockwood, No. 7928, June 8th. Also, previously in Keweenaw Co., No. 477, September 10th, 1886; Bois Blanc, Ontario, Canada, No. 477d, June 13th, 1905; Rochester, No. 2710, June 11th, 1912.

Gnaphalium purpureum Linn. Purple Cudweed. Michigan is north of the range given in our manuals, but it has been found in Macomb, St. Clair, Wayne, and Monroe counties. In fields near Temperance, No. 7995, July 13th. Previously at Detroit, No. 1609, July 12th, 1898.

Helianthus scaberrimus Ell., var. *subrhomboides* (Rydb.) Farwell. One of our rare sunflowers. Newport, No. 8076, August 17th.

Helianthus giganteus Linn, var. *altissimus* (Linn) O.A.F. Wild Sunflower. This variety is readily differentiated in the field by its prominently glaucous stems, generally glabrous below the branches and by the colorless tips of the chaff. Washington, No. 8039, August 3rd.

Helianthus Maximiliani Schrad., var. *Dalyi* (Britt.) O.A.F. Along the Ann Arbor Railroad near Ann Arbor, No. 8020, July 20th.

Coreopsis tinctoria Nutt. Tickseed. Common in cultivation, Escaped into vacant lots, etc. Detroit, No. 8052, August 10th.

Anthemis arvensis Linn. Corn Chamomile. Similar to the Mayweed or Dog Fennel, but without its offensive odor. The typical form has the chaff exceeding the disk flowers. Keweenaw Co., No. 693, September 10th, 1888; Detroit, No. 693a, July 15th, 1902; Parkedale, No. 4014, August 26th 1915. A variation with the chaff shorter than the disk flowers is the var. *agrestis* (Wallr.) DC. It flowers about a month earlier than the species. Roadside ditches near Due West, No. 7920, June 1st; Whitmore Lake, No. 7948, June 15th. Also at Rochester, No. 2083, June 16th, 1909.

Cirsium altissium (Linn) Spr. Thistle. In rich woods at Eames. Scarce. No. 8144, September 28th.

Cichorium Intybus Linn, f. *alba* Farwell. In fields near Eloise, No. 8023, July 27th.

Tragopogon major Jacq. Banks along the Ann Arbor road near Whitmore Lake. This is the 2nd known station for this species in North America, both being in Michigan, about 100 miles apart. No. 8013, July 20th.

Hieracium scabrum Mx. Hawkweed. A fine, large specimen of the typical form of this species was found on the barren hills back of Lake Linden. This is the first time I have observed it on the Keweenaw Peninsula. No. 8102, August 25th, 1927. Near by were a number of plants of the common form of this region, the var. *tonsum* Fernald. No. 8103.

Department of Botany,
Parke, Davis & Company,
Detroit, Michigan.

CONTRIBUTIONS TO THE BOTANY OF MICHIGAN, NO. 15

Miscellaneous Notes.

OLIVER ATKINS FARWELL

SCIRPUS

Scirpus atrovirens Muhl. Bulrush. In swampy places. Usually plentiful. Keweenaw Co., No. 549, August 22, 1887. On Belle Isle, No. 549a, July 21, 1893, and No. 965a, July 17, 1895. Rochester No. 3701, June 28, 1914. Junior, No. 5069; and Harris, No. 5079, July 13, 1918. River Rouge, No. 4343a, July 21, 1916. Detroit, No. 1640½, June 30, 1899; No. 1652b, August 12, 1899; 1657b, September 15, 1899. A variation with narrower, more sharply acute and paler scales is var. *pallidus* Britton. Detroit No. 1640, June 30, 1899. Keweenaw Co., No. 1640a, August 22, 1887. Another variation with non-nodulose leaves and spikes usually without bristles is var. *Georgianus* (Harper) n. comb. (*S. Georgianus* Harper). Michigan is included in its range, but I have not found it except in its *proliferous* stage which may be known as sub-var. *viviparus* n. subvar. Detroit, No. 5622, August 29, 1920. Another variation has the peduncles and pedicels shortened so that the inflorescence is reduced to a close, irregular head. This is var. *pycnocephalus* Fernald. Parkedale, No. 3021, August 4, 1912. Detroit, No. 1652a, August 12, 1899. [In the Herb. of P. D. & Co. is a sheet of the var. *Georgianus* from East Greenwich, N. Y., where collected by Dr. Asa Fitch in 1867. Also, a sheet of subvar. *viviparus* from Little Falls, N. J., where collected by Dr. H. H. Rusby in 1879.]

UNISEMA

In checking over the herbarium of Parke, Davis & Co., I find that the following new combinations under *Unisema* are necessary in order that the plants may be put away under their proper names.

Unisema lancifolia (Muhl.) n. comb. (*Pontederia lancifolia* Muhl. Cat. [1813] 34; Ell. Sk. [1817] I. 382. *P. lanceolata* Nutt Gen. [1818] I. 216.) Fernald says it is impossible to determine whether Muehlenberg and Elliott had the plant known as *Pontederia angustifolia* Ph. or the *P. lanceolata* Nutt. The probabilities are that Muehlenberg's species is the same as Nuttall's and in the absence of type material I designate the southern plant having opaque leaves with a short, free portion of petiole as the species intended by Muehlenberg. As Muehlenberg's name has priority, it should be retained.

Unisema lancifolia (Muhl.), f. *trullifolia* (Fernald) n. comb. (*P. lanceolata* f. *trullifolia* Fernald).

JUNCUS

Juncus acuminatus Mx. Rush. A species of Rush that is well distributed but never very frequent in any one place in so far as my observations go. Zoo Park near Royal Oak, No. 4319, July 13, 1916. Shelbyville, No. 6577, June 21, 1923. Erie, No. 6991, July 30, 1924. Algonac, No. 7275, October 15, 1924. Dearborn, No. 4516d, July 8, 1917, and No. 4532c, July 14, 1917. A variation with the flowers replaced in whole or in part by viviparous buds producing leaves while still attached to the plant has been named *J. paradoxus*. It may be known as *J. acuminatus* Mx., var. *paradoxus* (E. Mey.) n. comb. It is rarely seen in this section. Keweenaw Co., No. 511a, June 6, 1888. Detroit, No. 1390, July 3, 1893. [In the herbarium of Parke, Davis & Co. is a specimen from Franklin, N. J., where collected by Dr. H. H. Rusby in June, 1878].

Juncus alpinus Vill. Fernald in *Rhodora* vol. 10 p. 49 and Robinson and Fernald in Gray's *New Manual* pp. 270 and 277, describe the typical variety of this species as with castaneous flowers, the glomerules with one or more flowers elevated on pedicels above the others. But the typical variety as illustrated in Reichenbach's *Icones Fl. Germ. et. Helv.* vol. 9, plate 403, figs. 897 to 900, is a plant with all flowers in the glomerules sessile and the heads appearing almost black. This is the low alpine plant to which the name was originally

applied. I have found it at Copper Harbor. Very scarce. No. 1614c, August 23, 1898. A somewhat similar but larger plant with greenish or straw-colored flowers is the variety *fuscescens* Fernald. This has been collected at Parkedale, No. 3850, August 9, 1914. Belle Isle, No. 1609a, July 12, 1898, and No. 1391, June 13, 1895. A somewhat similar variety but with one or more flowers of each glomerule, pedicelled and raised above the others, is var. *insignis* Fries. It is well represented in Reichb., l. c., fig 896. I have collected this on Belle Isle, No. 1391, July 10, 1893. C. F. Wheeler collected it at Mackinac City August 12, 1890, and at Charlevoix, September 7, 1892. Another variety similar to the last but with castaneous flowers and capsules may be known as var. *Americana* n. var. (*J. alpinus* Amer. authors, at least in part). Frequently plants will be found in which all the glomerules are regularly formed. Much larger (12-18 inches high) than the typical variety (about 10 inches high) and the heads appear a glossy brown rather than black. Clifton, No. 837a, August 23-30, 1894. [The var. *insignis* was collected on Walpole Isl., Ont., Canada, No. 7093c, Sept. 3, 1924].

Juncus nodosus Linn. Now known to range nearly all over the North American continent. [Schaffner's No. 217, 1879, from San Luis Potosi, Mexico (Herb. P. D. & Co.) belongs here]. I have collected it at Clifton No. 512, August 1, 1887. On Belle Isle, No. 512a, July 16, 1892. Shores of Cass Lake, No. 7224, October 1, 1924. Parkedale, No. 3018, August 4, 1912.

POLYGONATUM

Since my paper on the Michigan species of this genus was published (Bulletin of the Torrey Botanical Club, Vol. 42), R. R. Gates and B. F. Bush have each presented a revision of the genus as found in America, the former in the Bulletin of the Torrey Botanical Club (Vol. 44) and the latter in the American Midland Naturalist (Vol. 10). Gates differs from me in his selection of a type for *Convallaria biflora* Walt., but can give no real, scientific reason for changing it. As a matter of fact, he does not do so, since he is mistaken as to the identity of Rusby's New Jersey specimens taken by me to be the same thing that Walter had. Gates never saw these

specimens, so when he writes that they are not nerved and so cannot be the same as Walter's, which are nerved, I am at a loss to find the basis of such a statement, unless it was the result of some sort of a dream. He selects the narrowest and rarest leaf form of the species, a form that Walter probably never saw. The commonest forms are the ones the ancient botanists dealt with, not the rarest; therefore, the probabilities are that Walter had a plant more similar to the ones of Rusby than to those of Chapman selected by Gates as typical of *P. biflorum*. Though I have not seen the Chapman specimens, I think that they cannot differ materially from the Rusby collection; they are narrower, but that is about all. They belong to the same category. *P. biflorum* is characterized by its narrow, elliptical-lanceolate leaves, cuneate or tapering at base. Rusby's specimens belong here; the longest leaf is 4.5 inches in length, and the broadest leaf is 11 lines wide at its widest part. It has prominent lateral veins. Gates' variety, *hebetifolium*, is based on plants with broader, shorter, more obtuse leaves without prominent lateral veins. The characters are good except the one last named, which is not constant. At least, all specimens that I have seen of the variety will show leaves with more or less prominent lateral veins in at least the lower or basal parts of the leaves.

Bush has referred a number of Deam's Indiana plants to this variety. I have seen some of Deam's numbers and some of them are mixed, containing specimens of both the type and the variety. He also referred Deam's No. 27603 to *P. Virginicum* Greene, with which it has no relation whatever. Deam's No. 27603 merely duplicates his Nos. 27234 and 27585, both of which Bush correctly referred to *P. bifolium* var. *hebetifolium* Gates, which he raised to specific rank. All three numbers belong here, with the exception of a part of No. 27585, which is good *P. biflorum*. *P. biflorum* var. *Virginicum* is based upon a plant in the U. S. Nat. Herb., sheet No. 36169. It has elliptical leaves 2 to 4½ inches long by .75 to 1.75 inches wide, narrowed or acutish at base. Like var. *ovatum*, it approaches *P. canaliculatum* as to size of plant only. It probably is restricted to Virginia; certainly it is not found in Indiana. I am indebted to Mrs. Chase for tracings of

P. Virginicum Greene, for which I tender my sincere thanks. Bush ignores *P. canaliculatum* Pursh. It is an older name than *P. commutatum*, and probably applies to some variation of it. Gates puts it in the uncertain and little known list on account of its *pubescent margins* (*tantum tenuissime pubescentibus*). I take it that such a described pubescence would require the use of a lens to observe it, and just such a pubescence (a very minute ciliolation) may be thus found on the margins of the leaves of what I have designated as *P. canaliculatum* and its varieties.

I agree with Gates that *P. boreale* is not specifically distinct from *P. pubescens*, but I would maintain it as a good variety rather than reduce it to the status of a pure synonym. The only difference is in the shape of the leaves and, as might be expected, they intergrade and pass one into the other. *P. hirtum* (Bosc.) Pursh is an older name than *P. pubescens*, but it applies to a species not now known. If found, it probably will prove to be quite distinct from *P. pubescens*. It was described as with pubescent stems and peduncles. I imagine that *P. parviflorum* (Poir.) Dietr. is a synonym of *P. canaliculatum* var. *Americanum*, perhaps a dwarfed or starved form collected while the plant was still in bud only.

My present understanding of the Michigan species is as follows.

P. pubescens (Willd.) Ph. Leaves suborbicular to broadly elliptic. Walled Lake, No. 4487, June 5, 1917; Detroit (Mill Road), No. 5448, May 23, 1920; shores of Marl lake, No. 5697, September 18, 1920. The following were originally referred here, but the specimens are not now available for re-examination: they may in part be *P. boreale*. Keweenaw Co., No. 380, June 20, 1886. Parkdale, No. 2983, August 4, 1912; No. 3472, June 15, 1913; No. 3969, June 13, 1915. Rochester, No. 3624, May 17, 1914.

P. pubescens (Willd.) Ph., var. *boreale* (Greene) n. comb. (*P. boreale* Greene). Leaves oval to elliptical-lanceolate. Walled Lake, No. 4489, June 5, 1917. Detroit (Mill Road), No. 5447, May 23, 1920. Probably belonging here are the following. Keweenaw Co., No. 380a, June 20, 1886. Ypsilanti, No. 380b, May 21, 1891. Detroit (Palmer Park) No. 3952,

May 31, 1915. These numbers are not available for re-examination. [As pointed out by Bush, Rusby's specimens from Mass. and N. J. belong here].

P. pubescens (Willd.) Ph., var. *boreale* (Greene) Farw., subvar. *australe* (Farw.) n. comb. (*P. boreale* var. *australe* Farwell). Rochester, No. 4819, May 15, 1918. Detroit (Mill Road), No. 5449, May 23, 1920, and No. 380d, May 9, 1895. The above have leaves rounded at the base. The following have the leaves more or less cuneate.

P. pubescens (Willd.) Ph., var. *cuneatum* (Greene) Farw. Detroit, No. 380c, May 9, 1895. Keweenaw Co., No. 3909, Sept. 27, 1914. Detroit (Palmer Park), No. 3951, May 31, 1915. Walled Lake, No. 4490, June 5, 1917. It has been observed in various other places.

P. pubescens (Willd.) Ph., var. *multiflorum* (Farw.) n. comb. (*P. boreale* var. *multiflorum* Farw.) I can see no good reason for elevating this to specific rank, as has been done by Bush. Walled Lake, No. 4488, June 5, 1917. I have not observed it elsewhere.

[*P. bifolium* (Walt.) Ell. Not observed in Michigan. As pointed out above, Rusby's N. J. collection belongs here and not with the variety *hebetifolium* to which it was referred by Gates. Also, undoubtedly all the collections cited by Gates. Likewise Deam's No. 27887, and that part of No. 27585 which shows narrowed or cuneate leaf bases. W. C. Johnson, Grane Creek, Miss., April 3, 1918.

P. bifolium (Walt.) Ell., var. *hebetifolium* Gates. The leaves in this variety are shorter, broader, and have rounded bases. Belonging here are Deam's No. 27603 (erroneously referred by Bush to *P. Virginicum* Greene, which does not occur in Indiana), No. 27234, and that part of No. 27585 which shows leaves with rounded bases. Also collections cited by Gates, except Rusby's N. J. collection, which is typical of the species].

P. biflorum (Walt.) Ell., var. *ovatum* Farwell. Leaves ovate to ovate-lanceolate (up to 5 inches by 2 inches) with rounded bases. The variation of the species with the largest leaves. Belle Isle, No. 1150a, June 8, 1893. Near Rochester, No. 3674, and at Parkedale, No. 3678 and No. 3679, June 11,

1914. A variation of this with ancipital stems (elliptical in cross-section) may be known as subvar. *ellipsoidale* n. subvar. Rochester, No. 4508½, June 28, 1917.

Polygonatum canaliculatum (Muhl.) Pursh. (*P. canaliculatum* var. *oblongifolium* Farw.) Leaves oblong or rarely elliptical-lanceolate, minutely ciliolate (*marginē tantum tenuissime pubescentibus*). The variatal name may be construed as the trinomial type of the species. Belle Isle, Nos. 1150½, July 23, 1892 and 1150b, June 8, 1893. Parkedale, Nos. 3676 and 3677, June 11 and Nos. 3682 and 3683, June 19, 1914. Rochester, Nos. 4236a and 4237a, June 25, 1916. Rockwood, No. 4234, June 24, 1916. [Deam's No. 27801 from Indiana belongs here].

P. canaliculatum (Muhl.) Pursh., var. *Americanum* (Hook.) Farw. Leaves ovate-lanceolate or somewhat broader. Our commonest Solomon's Seal and by most confused with the following variety. As a varietal name *Americanum* antedates *commutatum* by 35 years. To be sure, it was all embracing but it is quite appropriate to reserve it for the most prominent part of the aggregation. Ypsilanti, No. 1150, June 13, 1891. Rochester, No. 3675, June 11, 1914. Rockwood, No. 4235, June 24, 1916. A variation with ancipital stems may be known as subvar. *ellipticum* (Farwell) n. comb. (*P. ellipticum* Farw.) Rochester, No. 3673, June 11, 1914.

P. canaliculatum (Muhl.) Ph., var. *giganteum* (Dietr.) Farw. By far the largest of our Solomon Seals often reaching a height of 7 feet or more. Lower leaves round ovate or sub-orbicular, upper broadly oval, up to 7 inches in length or more. Parkedale, No. 3473, June 15, 1913.

P. melleum Farw. Flowers honey yellow. Algonac, No. 3974, June 16, 1915.

QUERCUS—THE OAKS

Of the oaks accredited to Michigan by Dr. Beal in his Michigan Flora I have found all but two (*J. Leana* and *Q. Schneckii*) and one (*Q. stellata*) that Dr. Beal does not mention. The only oak collected on the Keweenaw Peninsula by me is the Scrub Oak (*Quercus borealis* Mx. f.) I can see no good reason to support the shifting of *Q. rubra* from the

Northern Red Oak to the Southern Red Oak. Plukenet's t. 54, fig. 4, Sargent concedes may be *Q. rubra* as currently understood; also the acorn on Catesby's plate 23. Likewise, Linn's variety B. *Q. rubra* Linn, should therefore stand for the Northern Red Oak with Plukenet's t. 54, figures 4 and 5 as the foundation, excluding the reference to Gronovius.

Quercus alba Linn. The White Oak. Said to occur in the Upper Peninsula, but I have not detected it there; but a lone oak tree in a cleared 20-acre field near Calumet, Mich., is said to be the White Oak. I was never near enough to determine its identity. Well distributed over the Lower Peninsula. Usually in rather dry upland woods. Belle Isle, No. 881, Sept. 18, 1895. Parkedale, No. 3255 and No. 3271, October 27, 1912. Bloomfield, No. 5100, Sept. 8, 1918. Slocum's Island, No. 5981a, August 31, 1921. Monroe, No. 6716, August 22, 1923.

Quercus stellata Wang. Post Oak. Only one tree has been found. Probably at some time in the distant past it was more numerous. On the banks of Paint Creek near Rochester, No. 4583, Sept. 13, 1917, and No. 5192, Oct. 6, 1918.

Quercus macrocarpa Mx. Bur Oak. Said to occur in the Upper Peninsula, but I have not detected it there nor heard of it. Well distributed over the Lower Peninsula. In upland woods or in richer soil. Often called Cork Oak because of the often corky ridged branches. Belle Isle, No. 1488, Oct. 19, 1894. Parkedale. No. 3225 and No. 3246, Oct 27, 1912. Franklin, No. 5160, Sept. 23, 1918. Rochester, No. 5182 and No. 5191, Oct 6, 1918. Monroe, No. 6715, Aug. 22, 1923.

Quercus bicolor, Willd. Swamp White Oak. In low, wet grounds. Frequent. Ypsilanti, No. 1091, May 30, 1891. Belle Isle, No. 1091a, May 9, 1895. Monroe, No. 6714, Aug. 22, 1923.

Quercus Muehlenbergii Engelm. Chestnut Oak. Rich, wet woods. Scarce now, but was said to have been abundant in the early history of Michigan. Leaves narrowly oblong to lanceolate. Birmingham, No. 1583, Sept. 9, 1897.

Quercus Muehlenbergii Engelm., var. *Alexandri* (Farwell) Farwell. (*Quercus Alexandri* Britt.) Leaves obovate and the bark more ridged and flaky. In moist, rich woods or even on

dry upland soil. Birmingham, No. 1687, Oct. 2, 1900. Detroit, No. 3517, Oct. 4, 1913. French Landing, No. 6174, June 7, 1922. Newport, No. 6225, July 5, 1922. Parkedale, No. 6952, July 2, 1924.

Quercus Prinoides Willd. Similar to the preceding but usually a low shrub. Upland copses. Birmingham, No. 1584, September 9, 1897. Ypsilanti, No. 4835, May 19, 1918. Near Marl lake, No. 5714, September 18, 1920. Orion, No. 6837, September 26, 1923.

Quercus rubra Linn., p. p. and var *B.* Sp. Pl. (1753) 996 and of DuRoi, Harbk. Baumz. (1772) ii, pl. 5. (*Quercus maxima* [Marsh.] Ashe, Proc. Soc. Amer. Forest. [1816] XI. 90. *Q. borealis* Mx. f., var. *maxima* [Marsh.] C. S. Sarg., Rhodora [1916] XVIII 48. Red Oak. Widely distributed in southern Michigan. The type form of the Northern Red Oak. Belle Isle, No. 946, August 21, 1895. Monroe, No. 6711, August 22, 1923. Hamburg, No. 6771, September 5, 1923. Rochester, No. 6853, October 3, 1923.

Quercus rubra Linn, var. *ambigua* (Mx. f.) Fernald. (*Q. ambigua* Mx. f., Hist. Arb. Amer. [1812] II. 120, pl. 24; *Q. coccinea* Linn, var. *ambigua* A. Gr. Manual, [1867] 454; *Q. rubra* Linn, var. *borealis* [Mx. f.] Farwell, Ann. Rpt. Mich. Acad. Sci. [1904] VI. 206. A scraggy shrub or small tree on rocky bluffs where it is rather plentiful and in places forming almost impenetrable thickets. Called Scrub Oak. Never heard it called Gray Oak, as given in Manuals, etc. In the rich valleys of the Keweenaw Peninsula there is a large tree (100 feet more or less in height and about 3 feet in diameter) called Red Oak, but as I have never collected either fruit or leaves, I cannot say if it belongs here or to the typical variety. Keweenaw Co., No. 71, August 31, 1883.

Quercus palustris Muench. Pin Oak. In low, moist grounds. Well scattered over the southern part of the state. Belle Isle, No. 1337, September 16, 1892. Monroe, No. 6712, August 22, 1923.

Quercus ellipsoidalis E. J. Hill. (*Q. coccinea* \times *palustris* Hill.) Yellow Oak. Generally to be found on clay, sandy or gravelly grounds. Parkedale, No. 3274, October 27, 1912. De-

troit, No. 1572, September 8, 1897. Eames, No. 8138, September 28, 1927.

Quercus coccinea Muench. Scarlet Oak. Well distributed over the Peninsula. Usually in dry, upland soil. Birmingham, No. 1582, September 9, 1897. Rochester, No. 4414½, September 3, 1916. Parkedale, No. 4417b, September 3, 1916. Monroe, No. 6713, August 22, 1923. Hamburg, No. 6271b, July 12, 1922, and No. 6770, September 5, 1923. Orion, Nos. 6836 and 6839, September 26, 1923. Rochester, No. 6852, October 3, 1923. Ortonville, No. 8118, September 21, 1927.

Quercus velutina Lam. Black Oak. Scarce. Usually in dry, sandy upland soil. Birmingham, No. 1581, September 9, 1897. Parkedale, No. 3267, October 27, 1912. Rochester, No. 6868, October 17, 1923.

Quercus imbricaria Mx. Shingle Oak. Alluvial grounds. Only a single tree was found. Geddes, No. 2122, August 21, 1909.

ACALYPHA

Acalypha Virginica L. Mercury. A common enough plant everywhere. Not particular as to habitat as it is found in more or less open woods or in fields and pastures or on alluvial lowlands; on dry more or less sterile grounds or in wet, rich, or mucky lands. Variable as to habit; simple or copiously branched, from an inch or two to one or two feet. Dr. George Suttie collected this at Detroit in August in 1888 and in 1892. I collected it at Washington, No. 6001, September 14, 1921. On Belle Isle No. 1207a, August 4, 1892. Detroit, No. 1403c, July 25, 1893. Parkedale, No. 2842, July 14, 1912. Ysantilanti, No. 1207, September 2, 1891.

Acalypha gracilens A. Gr. Said to have been collected at Detroit by Dr. D. Clark. Have looked for it continually, but have not found it at Detroit. When I did find it, seemingly, I was unable to recognize it. Found it on sterile hill-tops near Washington, one of Dr. Clark's old stamping grounds, and published it as *A. Virginica* Linn, f. *purpurea* n. f. Washington, No. 6002, September 14, 1921.

PRUNELLA

Prunella vulgaris Linn. Selfheal. Heal All. Borders of woods, copses, fields, etc. Leaves rounded at base or the radical subcordate. In Keweenaw Co., No. 769½, July 25, 1895. In the variety *Pennsylvanica* (Willd.) Nutt. the leaves are larger, narrower, and tapering at the base. On Belle Isle, No. 317b, July 25, 1893.

STACHYS

Stachys palustris Linn. Hedge Nettle. Leaves short and broad, ovate-oblong, subordate, 2 or 3 inches by .5 to 1. Wet grounds near Clifton, No. 280, July 26, 1885. In the type form, the sides of the stems are appressed pubescent. In the variety *homotricha* Fernald, the sides of the stem are hirsute. On the Mendota location in Keweenaw Co., No. 1826a, August 4-11, 1904. In the variety *arenicola* (Britt) n. comb. (*S. arenicola* Britt.) the leaves are linear (4 to 6 inches long by .25 to .5) and are more densely pubescent. The stems are hispid on the sides. When I first collected this, I sent a specimen to the Gray Herbarium, if my memory serves me rightly, suggesting that it was not to be found in the Manual and that it probably was an unnamed variety of *S. palustris*. The response was to the effect that it was only *S. palustris*. Many times I have been on the verge of publishing it, but have delayed until now. In sandy locations at Clifton, No. 281, July 26, 1885.

SOLIDAGO

Solidago. Goldenrod. Away back in 1893 or 1894 when studying our Shore Goldenrod, collected on rocky shores at Copper Harbor, Keweenaw Co., Mich., I discovered that the name under which it was passing (*S. humilis* Ph.) was untenable because of an earlier *S. humilis* Miller. Being uncertain of the synonymy appertaining to our Shore Goldenrod, I sent specimens to Dr. T. C. Porter, requesting him to rename our Shore Goldenrod, suggesting the name *S. Solandri* if there were no published name applicable. Dr. Porter agreed to investigate and did so, but discarded my suggested name for one of his own selection. I asked why the change? I got no

explanation but an offer of a supplementary publication explaining and changing the name to the one suggested by me. I declined on the grounds that Porter's name already published could not be set aside. The name, *Solidago Purshii*, Porter, was not intended to replace *Solidago humilis* Pursh of the Fl. Am. Sept. based upon a plant in the Banksian herbarium as it is now understood; but to give a name to the Shore Goldenrod of the Lake Superior District which was passing as *S. humilis*!!! To be sure, at that time, both were thought to be identical, but that will not invalidate the application as intended, since actual specimens from the Lake Superior district were sent with the request, as mentioned above, and the new name was intended to apply to them as the type rather than as a literary exchange for the name of the Fl. Am. Sept., hence Porter's refusal to quote that publication. In Rhodora Vol. 10, 88-91, Fernald adopts *S. racemosa* Greene and gives his reasons therefore. But Greene's name is three years later and does not apply to the common variation of the species. Fernald says: "Porter rejected the name *S. humilis* Pursh and assigned to the plant which has been passing as Pursh's *S. humilis* the name *S. Purshii* [italics mine] defining his species merely by the citation of the synonym *S. humilis* Pursh. The name *S. Purshii* Porter is therefore strictly synonymous with *S. humilis* Pursh; and the names *S. humilis* and *S. Purshii* are equally untenable for the plant of our northeastern riverbanks and cliffs." Fernald seems to contradict himself. If *S. Purshii* was applied to the plant passing as *S. humilis* Pursh, which it certainly was, it is just as certain that it can not be "strictly synonymous with *S. humilis* Pursh," and can not be "untenable." For my part, whenever occasion occurs I shall use the name *S. Purshii* Porter for our Shore Goldenrod as it was the original intention of myself and Dr. Porter that such should be the case. All plants from the Keweenaw peninsula which I have observed have glutinous involucre and stems and leaves more or less so. Copper Harbor, No. 501, July 28, 1887; No. 501a, August 20, 1898; 501b, August 16, 1921; Eagle Harbor No. 6601, June 29, 1923. [Plants from the Potomac region, not at all glutinous were named by Dr. Greene *S. racemosa*. This non-glutinous variation may be

known as *Solidago Purshii* Porter, var. *racemosa* (Greene) n. comb.]

Solidago humilis Miller (*S. nemoralis* Ait.) Dwarf, Field or Grey, Goldenrod. The *Index Kewensis* refers this name to *S. Canadensis* Linn., which is characterized by three nerved leaves. Miller fails to give any information about a three-nerved leaf, which he would have done if his species were some variation of *S. Canadensis*. It is pretty certain, therefore, that the leaves are not three-nerved and that the species is not *S. Canadensis* Linn. It should be looked for amongst those species the leaves of which are not prominently three-nerved. The low stature and the leaves would at once suggest *S. nemoralis* Ait. But the inflorescence of this species as usually found in Michigan in no wise fits the description of Miller. Ever since I took the steps that resulted in the banishment of *S. humilis* Pursh, I have been trying to find a way of satisfactorily placing *S. humilis* Miller, but without avail. In 1927, however, I found a field with luxuriant *S. nemoralis* with a paniculately corymbiform inflorescence such as is described by Miller, and I have no doubt but that is just what Miller had. I note that Mackenzie has come to pretty much the same conclusion, independently. The plants range up to 42 inches in height and are copiously branched from the axils of the leaves on the upper third of the stem. The branches range up to 10 inches in length and are clothed with small foliaceous bracts; they are erect and all together form a more or less trumpet-shaped, erect inflorescence. Only the uppermost quarter section of the branch bears flowers, and these are aggregated into a compact, ovoid, one sided, recurved, and flattened thyrses up to $2\frac{1}{2}$ inches long and about 1 inch wide at the lower end. Ortonville, Nos. 8121 and 8126, Sept. 21, 1927. The ordinary form of this species as found in Michigan has a simple stem, and is much lower in stature, about 30 inches. Thyrses terminal, more or less elongated and cylindrical, or branched and ovate, up to 9 or 10 inches long by 1 to 5 inches wide. It may be known as var. *reducta* n. var. Detroit, No. 933a, Sept. 27, 1895; No. 1621a Sept. 20, 1898; No. 1869, Sept. 9, 1904; No. 1947a, August 30, 1905. Parkedale, No. 3125, Sept. 2, 1912. Goodison, No. 5381, Sept.

4, 1919. Algonac, No. 7271, Oct. 15, 1924. Ortonville, No. 8122, Sept. 21, 1927. Monroe, No. 8095, August 17, 1927 (immature). Washington, No. 8038, August 3, 1927 (immature). In the above the basal and radical leaves are oblanceolate and acute. In the following the radical leaves are spatulate and rounded to spatulate-oblanceolate and acute. This may be known as subvar. *spatulata* n. subvar. Orion, No. 933, August 29, 1895. Pittsfield, No. 7828, Sept. 29, 1926. Birmingham, No. 933b, Sept. 27, 1898.

*Dept. of Botany,
Parke, Davis & Co.,
Detroit, Mich.*

THE STRATIGRAPHY AND LARGER FOSSILS OF THE PLATTIN FORMATION IN STE. GENEVIEVE COUNTY, MISSOURI.*

I. INTRODUCTION

The principal Platin exposures whose rocks and fossils are here discussed lie some seven miles south of the town of Ste. Genevieve, Missouri, and near the village of Ozora. On the Weingarten topographic sheet of the United States Geological Survey the region in which the exposures lie is shown by a large hill lying south of the Beckett Hills, and to the right of the River Aux Vases. It extends some distance west of the hill, and in a southeasterly direction to the Little Saline Creek. For convenience in reference the name South Beckett Hill is here used for the unnamed hill of the map, while the general area is referred to as the Little Saline region, from the name of the creek flowing through it.

Most of the fossils were collected on South Beckett Hill, though a few represent exposures south and west of it. Collections were made by Dr. Stuart Weller from exposures along Gabouri Creek, some two and one-half miles west of Ste. Genevieve, and these have been included among the material examined.

II. ACKNOWLEDGMENTS

The field work in preparation for this paper was carried on under the direction of the late Dr. Stuart Weller, and a considerable part of the paleontologic study was done at the Walker Museum of the University of Chicago, thereby receiving the benefit of Dr. Weller's criticism. Although the figured types remain in the Chicago collections, a series

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of paratypes and plesiotypes, and a number of casts have been deposited in the University of Cincinnati Museum, along with metatypes of some Platin and Decorah species previously described.

The data for Section III, F, dealing with the relationships of the Platin strata of Ste. Genevieve County to those of other districts in Missouri, have been contributed *in toto* by Dr. Josiah Bridge, of the Missouri School of Mines and Metallurgy. Dr. Bridge also has examined and commented on the generalized section of the Ste. Genevieve County Platin.

III. STRATIGRAPHY

A. JOACHIM FORMATION

The geologic column of the eastern half of Ste. Genevieve County begins with the Potosi formation, of Ozarkian age. In the region of South Beckett Hill, however, the oldest formation exposed is the Joachim, belonging to the Big Buffalo series of Ulrich. It consists of 120 to 150 feet of limestone, yellowish to buff, and generally dolomitized. Except for small specimens of *Leperditia*, fossils are few and poor.

B. PLATTIN FORMATION

Upon the Joachim, and separated from it by an erosional unconformity, lie the 200 or more feet of limestone comprising the Platin Formation in its Ste. Genevieve County phase. This, the southern equivalent of the Platteville of the upper Mississippi valley, was the particular object of field study. More than three weeks were spent on the exposures along South Beckett Hill alone. Several detailed sections were made, and though these show surprising variations, they possess key strata which make correlation easy. By means of them the following generalized section of the Platin of South Beckett Hill has been prepared. Although no careful field work has been done in other localities, casual examination, and the collections made by Dr. Weller in the vicinity of Ste. Genevieve, indicate that this section will apply with fair

accuracy to the Plattin of Ste. Genevieve County. Its relation to the formation as a whole is discussed in Section IV.

GENERALIZED SECTION

	Feet Inches	
43.—Limestone in medium to heavy beds, with much chert. Pelecypods of the genera <i>Cyrtodonta</i> and <i>Vanuxemia</i> abundant; <i>Endodesma</i> sp. rare	8	
42.—Limestone, medium-bedded, largely replaced by brown chert. <i>Streptelasma corniculum medium</i> , <i>Strophomena plattinensis</i> , <i>Cyrtodonta</i> spp., <i>Vanuxemia</i> spp. the chief fossils	2	4
41.—Limestone, thin-bedded, with fossils in irregular lenses. <i>Strophomena plattinensis</i> and bryozoans common	6	
40.—Limestone, thin-bedded. <i>Strophomena plattinensis</i> , <i>Dinorthis deflecta gibbosa</i> , <i>Pianodema perveta</i> , <i>Orthis tricenaria</i> the only fossils identified	8	
39.—Limestone, thin-bedded, gray. <i>Streptelasma</i> and bryozoans common; <i>Isotelus maximus?</i> and <i>Bumastus</i> sp. not rare	8	
38.—Limestone, buff, dolomitic, cherty, weathering to small fragments. No fossils noted	9	6
37.—Limestone, buff to gray-buff, soft, crystalline. Algal (?) masses common	8	
36.—Limestone, buff to buff-gray, with numerous fucoidal cavities. Major beds 12 to 18 inches thick; minor ones 1 to 5 inches	5	
35.—Limestone, white, crystalline, algal, with large stromatoporoids and small masses of <i>Columnaria halli</i>	8	
34.—Limestone, buff to gray-buff, medium bedded, with abundant fucoidal cavities	7	6
33.—Limestone, buff to grayish, heavily bedded, with fucoidal cavities	6	
32.—Limestone, buff to gray, thinly and unevenly bedded, cherty. Lower portions contain <i>Streptelasma corniculum medium</i> , <i>Monotrypa magna</i> , and <i>Dystactospongia minor</i> in abundance	8	6
31.—Limestone, fine-grained. Contains some algae (?), abundant specimens of <i>Strophomena plattinensis</i> , <i>Liospira</i> , <i>Trochonema</i> , <i>Clathrospira</i> , <i>Helicotoma tennesseensis</i> and <i>Leperditia fabulites</i>	4	

	Feet	Inches
30.—Limestone, buff to gray, thinly bedded, with small fucoi- dal casts and cavities -----	3	4
29.—Limestone, gray, fine-grained; algae (?) common-----		4
28.—Limestone, buff to gray, fucoidal -----	2	4
27.—Limestone, buff to gray, fine-grained, with abundant fos- sils. <i>Columnaria halli</i> appears in small masses, <i>Piano-</i> <i>dema subaequata</i> , <i>P. perveta</i> , <i>Dinorthis deflecta gibbosa</i> are common; <i>Helicotoma tennesseensis</i> is rare. The diag- nostic feature is the abundance of opercula belonging to <i>Maclurites bigsbyi dixonensis</i> . Shells are less common, and rarely can be extracted -----	2-4	
26.—Limestone, gray, in beds 4 to 8 inches thick. Lower feet form the chief horizon of <i>Actinoceras gravicentrum</i> . <i>Eurytomites robertsoni</i> is rare. Casts of <i>Maclurites</i> <i>bigsbyi dixonensis</i> are common in the upper 10 inches; opercula are rare. <i>M. bigsbyi</i> small, rare-----	5	
25.—Limestone, gray, fuicoidal, with heavier bedding than No. 26. <i>Actinoceras gravicentrum</i> common -----	2	10
24.—Limestone, gray, thinly and irregularly bedded, weather- ing to heavy ledges. At the top a very large specimen of <i>Columnaria halli</i> was secured -----	5	6
23.—Limestone, gray, thinly bedded, fucoidal, capped by 1 to 2 inches of blue shale -----	2	6
22.—Limestone, buff to gray, fucoidal. At the top is a 6 inch layer crowded with <i>Zygospira variabilis</i> , scattered speci- mens of which are found throughout the member.-----	5	
21.—Limestone, buff to gray, regularly but thinly bedded, with chert lenses. Fucoidal molds large, suggesting <i>Butho-</i> <i>trepis brachiatus</i> -----	4	
20.—Limestone, buff, crystalline, medium-bedded, highly fossil- iferous, but with the specimens mere fragments of bryozo- ans, brachiopods, gastropods and echinoderms -----	4	
19.—Limestone, thinly and irregularly bedded; fossils rare--	14	6
18.—Limestone, buffish to gray, with heavier and less regular bedding than No. 19. Fossils rare and poor -----	7	
17.—Limestone, gray, heavily bedded, fucoidal -----	1	
16.—Limestone, white, thinly or medium-bedded, fractured. Contains tubes like those of No. 15 -----	3	
15.—Limestone, white, fine-grained, hard, in beds 4 to 8 inches thick. Pierced by abundant vertical tubes or borings, whose fillings are yellow and dolomitic; these borings unite, two or three together, upward, so that they open		

	Feet Inches	
upon the superior bedding plane as a single tube. Horizon of <i>Paleophycus tubularis</i> , as identified in this paper.....	2	6
14.—Limestone, buff to gray-buff, in beds 2 to 6 inches thick. <i>Buthotrephis regularis</i> and <i>B. sp.</i> diagnostic; other fossils rare and poor.	19	
13.—Limestone, gray, algal; <i>Strophomena plattinensis</i> common, but poorly preserved. <i>Leperditia</i> common.....	7	
12.—Limestone, buff to gray, thinly to medium in bedding, honeycombed by small fucoidal molds. In blocks on a talus slope were found one small mass of <i>Columaria halli</i> , a few specimens of <i>Streptelasma corniculum medium</i> , <i>Strophomena plattinensis</i> , <i>Pianodema subaequata</i> and <i>Leperditia fabulites</i> . Heavy talus prevents determination of horizons within the member	21	
11.—Limestone, gray, medium-bedded, fucoidal, weathering to ledges 12 inches or more in thickness. Poorly preserved gastropods and orthoceratoids uncommon	5	6
10.—Limestone, fucoidal, thinly and irregularly bedded.....	6	
9.—Limestone, buff to gray, thinly bedded, fractured, fucoidal	2	
8.—Limestone, gray, algal	6	
7.—Limestone, grayish, thinly bedded, fractured; contains fucoidal casts 1 to 2.5 inches in diameter	3	
6.—Limestone, buff to gray, fucoidal, heavily bedded	2	
5.—Limestone, grayish, thinly bedded, fucoidal, fractured; weathers to small chips	3	
4.—Limestone, gray-buff, thinly bedded, fucoidal; weathers to layers 8 to 12 inches in thickness	4	
3.—Limestone, yellowish to greenish-gray, soft and shaly. <i>Protorhyncha</i> (?) <i>plattinensis</i> abundant, crowding the member wherever it is exposed. Like the <i>Zygospira variabilis</i> member, a persistent and readily identifiable horizon	6-8	
2.—Limestone, buff, shaly, grading into buff shale. At one locality a few specimens of <i>Protorhyncha</i> ? <i>plattinensis</i> were found. No other fossils noted	5	
1.—Limestone, buff, fine-grained, dolomitic, weathering to polygonal blocks. Orthoceratoids the only fossils noted	6	

Maximum Thickness, 207 Feet.

Examination of the individual sections from which the generalized one has been compiled shows that the numerous members may be grouped into six main divisions, each

of which is reasonably distinct in both lithology and fauna. Unfortunately, most of the Platin fossils which have been described and identified range nearly throughout the formation in its Ste. Genevieve phase. Therefore, it has seemed advisable to designate but one of these six major units a zone, and to apply to others the noncommittal term of "beds."

SUMMARY SECTION

Feet Inches

6.—Brachiopod-Pelecypod Beds.		
Members 39-43. Limestones, thinly bedded, cherty, highly fossiliferous. Brachiopods and pelecypods abundant	32	
5.—Upper Columnaria Beds.		
Members 28-38. Limestones, medium or thinly bedded. <i>Columnaria halli</i> , <i>Monotrypa magna</i> , <i>Streptelasma corniculum</i> medium abundant in several layers. The first attains only a moderate size	44	2
4.—Lower Columnaria Beds.		
Members 22-27. Limestones, more heavily bedded than those of Number 5. Large heads of <i>Columnaria halli</i> throughout; <i>Maclurites</i> and <i>Actinoceras</i> in upper two-thirds	21	4
3.—Fucoidal Beds.		
Members 4-21. Limestones pitted by innumerable fucoidal molds; casts less common. Where present they often are soft, yellowish, dolomitic and porous. <i>Columnaria</i> rare; <i>Monotrypa</i> apparently lacking. Fossils relatively uncommon in the lower half	103	
2.— <i>Protorhyncha</i> ? <i>plattinensis</i> Zone		
Members 2-3. Limestone, shaly, with <i>Protorhyncha</i> ? <i>plattinensis</i> abundant in the upper portion	5	8
1.—Basal Limestone Beds.		
Member 1. Limestone, fine-grained, which lies upon the eroded beds of the Joachim formation		6

C. DECORAH FORMATION

Upon the Platin, and in some places apparently continuous with it, lie four to six feet of shale and shaly limestone, the Ste. Genevieve facies of the Decorah of Iowa and Minnesota. The characteristic fossils are *Strophomena dig-*

nata, *S. delicatula*, *Pianodema perveta*, and unidentified branching bryozoans. Of these species, the second and third are characteristic of the true Decorah.

The principal collections from this formation were secured by Dr. Weller, at exposures about two and a half miles west of Ste. Genevieve.

D. OTHER FORMATIONS

The remaining rocks of South Beckett Hill include the Kimmswick limestones, equivalent to the Galena of more northern regions, and bearing the typical Galena fossil, *Receptaculites oweni* Hall; the Fernvale, Thebes and Orchard Creek formations, of Richmondian age; and the Kinderhook, Keokuck and Burlington members of the Mississippian. The latter reach their full thickness for the region some distance east of South Beckett Hill.

Unfortunately, the shales of the Orchard Creek formation appear to be unfossiliferous, thus preventing any attempt to compare the fauna of that member with that of the Platin and Decorah.

E. SILICIFICATION, CHERT

In numbers 22 to 43 of the general section of the Platin formation silicified fossils are common, and many of those in lower members are similarly preserved. In some, such as the *Streptelasma* bed (number 32), fossils are silicified throughout. In others, notably the operculum bed (number 27), the silicification is largely superficial, so that shells preserved in silica near and above the surfaces of slabs are calcified at depths of from two to five millimeters.

Another indication of the superficiality of the silicification is found in the fact that in loose slabs the process is more nearly complete than in pieces of rock secured *in situ*. Such a specimen is shown in Fig. 10 of Plate IV, in which the outer part is siliceous, and the core a crystalline limestone. A specimen of *Streptelasma corniculum medium* in this slab consists, near the surface, of siliceous material, and toward its base, of calcite.

The beds and lenses of chert, moreover, are thin, small.

and superficial. The thickest of them occur in the upper members of the Platin on South Beckett Hill, at points where the surface slopes gradually and residual soil, while thin, holds enough vegetation to prevent rapid run-off. Even in these lenses, however, silicification is commonly incomplete, and masses of crystalline limestone may be found almost surrounded by silica.

So far as the Platin is concerned, therefore, the cherts of South Beckett Hill are of very recent origin, and the process by which they were made is now in progress. Whether or not this generalization can be extended to the Mississippian cherts of the same region I do not know.

F. RELATIONSHIPS OF THE STE. GENEVIEVE PHASE OF THE PLATTIN

The Platin rocks of Ste. Genevieve County, with a maximum thickness of about 207 feet are considerably thicker than those of St. Louis County, some sixty miles to the northward. Dr. Bridge's most complete section for the latter region, taken at Nimm's Siding, one mile east of Glencoe, Missouri (Sec. 17, T. 44 N., R. 4 E.) shows part of the Joachim, 122 feet of Platin, 16 feet of Decorah, and the two lowest members of the Kimmswick. In detail it is:

KIMMSWICK FORMATION

	Feet	Inches
15.—Limestone, massive, white to grayish, whose weathered surfaces show a coarse "worm-eaten" texture	13	
14.—Limestone, coarse, white, containing <i>Endoriceras proteiforme</i> and <i>Receptaculites oweni</i> —the latter typical of the basal Kimmswick on South Beckett Hill	4	

DECORAH FORMATION

	Feet	Inches
13.—Limestone, thin-bedded, arenaceous and argillaceous, with thin beds of greenish shale and some beds of pure limestone 1 to 6 inches thick. One bed in particular, some 6 feet from the top, contains <i>Pianodema subaequata</i> and <i>Stictoporella angularis</i>	16	

(Numbers 13 to 15 outcrop in an almost vertical cliff Below them the beds are much covered by talus, and the section is transferred to the western edge of the hill, about one hundred yards distant.)

PLATTIN FORMATION

	Feet	Inches
12.—Covered interval of -----	15	
One or two thin beds of coarsely crystalline gray limestone contain <i>Streptelasma</i> and <i>Orthis tricenaria</i> in silicified specimens.		
11.—Limestone, gray, crystalline, containing many gastropods	1	
10.—Limestone, pale gray to pinkish, with fucoidal cavities...	6	
9.—Limestone, crystalline, grayish, weathering to thin plates and grading into the overlying bed. Fossils uncommon	10	
8.—Limestone, thin-bedded, pinkish gray, weathering to white, with abundant fucoidal cavities. Throughout it are scattered thin fossiliferous layers, the richest ones being at the base and 25 inches below the top-----	42	
7.—Limestone, pinkish gray with fucoidal cavities; fossils Mostly covered by talus -----	27	
(Top of abandoned quarry)		
6.—Limestone, thin-bedded, pinkish to dove-colored, sub-lithographic in texture, without fucoidal cavities. Several thin fossil beds in the upper part -----	8	
5.—Limestone, massive, bluish to pinkish blue, weathering to yellow. Fresh rock breaks with conchoidal fracture; fucoidal cavities abundant. Lower 2 feet crowded with bryozoans -----	12	
4.—Shale, olive-green, laminated -----	1	6

JOACHIM FORMATION

	Feet	Inches
3.—Dolomite, thickly and evenly bedded (6 to 18 inches), pinkish to bluish gray in color, with conchoidal or semi-conchoidal fracture. Bedding somewhat irregular; no fossils seen -----	13	6
2.—Limestone, blue to gray, in beds 6 to 8 inches thick, interbedded with thin layers of green shale. Weathers to gray or buff; carries small knots of clear calcite -----	8	8
1.—Dolomite, gray, coarse, with very irregular bedding. Contains masses of clear calcite 12 inches or more in diameter (Floor of quarry. Rock similar to Number 1 is exposed in the floor, its upper surface being undulating and suggesting giant ripples.)	3	

Summary of Section:

Kimmswick Formation, lower beds	17 feet
Decorah Formation, approximately	16 feet
Plattin Formation	122 feet
Joachim Formation, upper beds	25+ feet

In this section the limestone which forms the base of the Plattin in the Little Saline region is lacking. Hand specimens from Number 4 contain numerous examples of *Protorhyncha plattinensis*, which indicate that horizon to be equivalent to Number 3 of the Ste. Genevieve County section. The fossiliferous beds of Number 12 probably correspond to Numbers 39 or 40 of the latter, and indicate that the difference in thickness between the two sections probably is caused by thinning rather than by omission of any major members in the St. Louis County section.

Near House Springs, in the De Soto quadrangle, Dr. Bridge found a large *Columnaria* about sixty feet below the Plattin-Kimmswick contact, at an exposure in which the thickness of the Decorah is fifteen or twenty feet. In the underlying fifteen feet he secured stromatoporoids, *Monotrypa magna* Ulrich and casts of *Maclurites*. *Actinoceras gravicentrum* appeared in the upper seventy feet of the formation, thus ranging higher than it appears in Ste. Genevieve County. Near Pacific, Missouri, the same species occurs about seventy feet above the base of the Plattin.

North of the Missouri River Dr. Bridge has found that the Plattin rarely exceeds fifty feet in thickness. Southward, on the other hand, it thickens markedly, and near Cape Girardeau exposures and drill holes indicate thicknesses of six hundred or more feet. In the upper hundred feet Dr. Bridge has collected specimens of *Tetradium cellulosum*, a species which occurs also at House Springs, although its horizon there has not been determined. *Orthis tricenaria* appears near the top of the formation, where it is abundant.

From these observations it appears that the Plattin of the Little Saline region, though some eighty-five feet thicker than that of St. Louis County, is essentially equivalent with it. The upper beds of the formation, as well as the Decorah, are found north of the Missouri River, but whether or not representatives of the entire Ste. Genevieve section are present Dr. Bridge has been unable to determine. In Cape Girardeau County the Plattin reaches its greatest known thickness. Only the equivalents of the upper part of the South Beckett Hill section have been determined, however, so it is uncertain whether the great thickness represents added beds in the lower part of the formation or merely a general thickening.

SOME NOTES ON DIBOTHRIOCEPHALUS PERFOLIATUS.

FRANCIS WENNINGER.

The specimens described in the following paragraphs were collected from material secured by the German South Pole Expedition of 1901-1903. They were sent to Professor Pintner, head of the department of invertebrate zoology in the University of Vienna, who placed the material at my disposition for determination and description.

The specimens, though now over a quarter of a century old, are in a remarkable state of preservation. Aside from a slight bleaching and some brittleness due to the action of the preservative fluid, the specimens are quite suitable for investigation.

Mention must be made here of the procedure followed in staining sections. The ordinary paraffin method was used, and the sections cut to a thickness of ten micra. Borax carmine as a staining agent proved unsatisfactory. The best results were obtained by using Ehrlich's hematoxylin preceded by iron alum. The sections were taken through the alcohol series and then treated with distilled water. They were then immersed in a bath of iron alum for about twenty minutes, washed in distilled water and stained for about five minutes with Ehrlich's hematoxylin. The stain is washed off under running tap water. Distilled water does not give results. Sections prepared in this way show every detail of structure, especially the nucleus.

Up to the present, about fourteen species of Bothriocephalidae have been described. But this number must be reduced to eleven because three specific names are evidently synonyms.

The species under consideration is *Dibothriocephalus perfoliatus*, (*Diphyllobothrium clavatum*, Railliet.) It was found in seven specimens of a species of seal,—*Leptony-*

chotes Weddellii, where it inhabited the small intestine, accompanied, in several cases at least, by hundreds of specimens of small Bothriocephalids,—*D. mobilis* and *D. Wilsonii*.

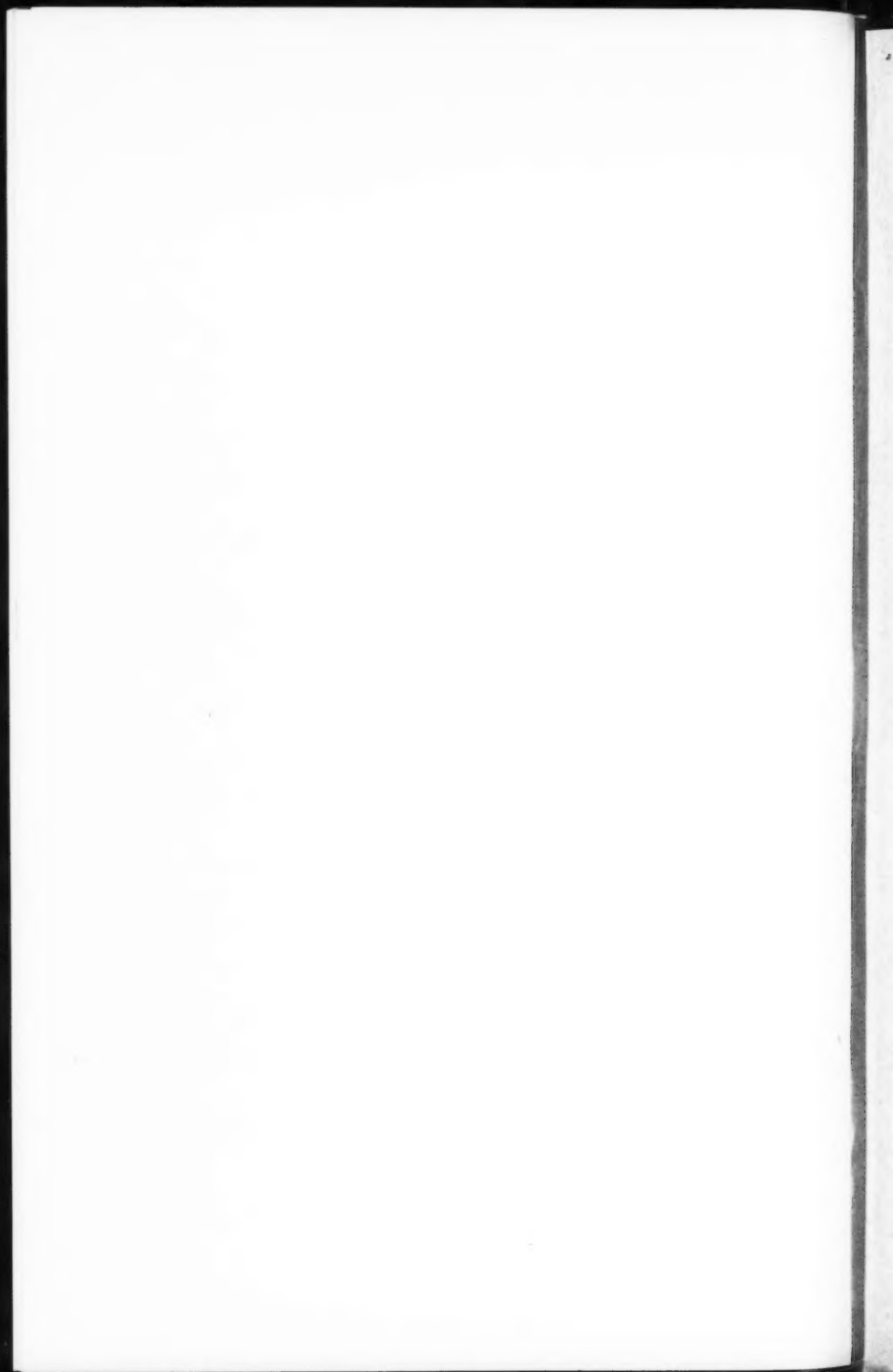
D. perfoliatus attains a length of 25 centimeters. The proglotids reach a maximum width of 7 mm. The smallest specimen in the material in my possession has a length of only 6 mm. while the largest measures about 80 mm. It is worthy of note that none of the individuals has reached sexual maturity. This precluded all possibility of ascertaining the number or location of the uterine apertures. A rather thorough examination of all the material in my possession seems to warrant the conclusion that the worm reaches maturity only at a considerable distance from the strobila. An outstanding characteristic of the species is the shortness of the individual segments and their overlapping, not only on the succeeding segment but, in many cases, on the two following segments. In mature segments measuring .45 mm the overlapping portion will measure .7-.8 mm. In regard to the number of segments, the following observations will be of interest. A specimen that measured 120 mm had 450 segments. In the first 5 mm of the strobila, the segments measured .03 mm in length; from 5 to 15 mm, the segments measured 1 mm; from 15 to 30 mm, .28; from 30 to 60 mm, .37 and from 60 to 120, .45 mm in length. There is a gradual increase in the breadth of the segments, the maximum being reached at about 2 centimeters from the end of the strobila, where it measures 6 mm. The cuticle is quite thick,—.016 mm. Underneath the cuticle there is a strongly developed subcuticular muscle sheath. The muscles of the parenchyme are powerfully developed and consist mainly of muscle bundles that measure up to 1 mm. Transverse muscle fibers are present in large numbers though they seem to be underdeveloped. The dorso-ventral bands of muscle are again well developed. Scattered in through the entire parenchyme there are numerous calcium bodies. These measure .12 mm.

The excretory system shows considerable branching. It appears to consist peripherally of 16 tubes of which 8 are

dorsal and 8 ventral. The branching is carried even into the overlappings of the proglottids. The anastomosis of the excretory system is especially remarkable in the region of the scolex. Some at least of the excretory tubes are surrounded by two sheaths of muscle, one longitudinal and the other a sphincter muscle. The reproductive organs develop quite slowly. Mature ova were not found in any of the shorter specimens, and even in fully developed worms, these occur only 6 or 7 centimeters after the scolex. The male reproductive organs are those commonly found in all Cestoda. The testes are nearly round and have a diameter of .06 to .08 cm. A cross section shows about 14, while a sagittal sections shows from 3 to 6. The total number in one individual is certainly in the neighborhood of 120. The cirrus sac is pyriform and about .24 mm long with a diameter of .12 mm. The cirrus is thick. The seminal vesicle is .14 mm long and .1 mm in diameter. The muscular development here is especially remarkable whereas it seems to be lacking in the cirrus itself.

The female reproductive organs are the type usually found in all Cestoda. One interesting departure from type must be noted. The uterus shows very little branching. Usually only one loop on either side is filled with mature ova. The loops are uniformly about .9 mm in diameter. Railliet has called attention to the fact that the uterus does not open behind the cirrus and vagina but irregularly to the right or to the left and never near the cirrus. The reason for this might be found in a foreshortening of the proglottis. The ova measure .06 to .064 mm in length and .045 to .048 mm in breadth.

*First Zoological Institute,
University of Vienna.*



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